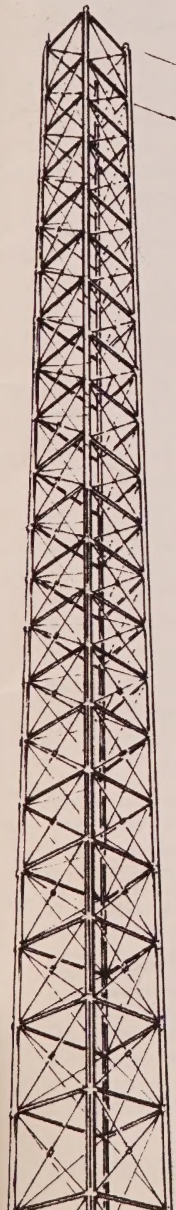
The OTB

OFFICIAL JOURNAL OF THE ANTIQUE WIRELESS ASSOCIATION, INC.

Published for the collector, historian and old-time radio operator

THE OLD TIMER'S BULLETIN NOVEMBER 2003 VOL. 44 / #4



Cal Sheckler (left) and Les Moore at the conference flea market PHOTO BY DICK RANSLEY

CONFERENCE 2003 RETROSPECTIVE ISSUE

TIME-SENSITIVE PROXY MATERIALS ENCLOSED
PLEASE REVIEW AT ONCE!

THE OLD TIMER'S BULLETIN

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WHOM TO CONTACT

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DUES AND ADDRESS CHANGES: Joyce Peckham (Secretary), Box E, Breesport, NY 14816, (607) 739-5443; FAX: (607) 796-6230, e-mail: awapeckham@aol.com. Dues: $20 per year in U.S.; $25 elsewhere. Life membership: $400 in U.S.; $500 elsewhere. Make checks payable to "AWA."

AWA OFFICIAL BUSINESS: Geoffrey Bourne (President), 405 8th Ave., St. Albans, WV 25177-2853, (304) 722-4690, gcbourne@citynet.net.

BUSINESS CARD ADS: Robert W. Perry, W2TIX, "Smoke Signals," 131 E. High St., Painted Post, NY 14870.

OTB SUBMISSIONS: Marc Ellis, Editor, *OTB*, P.O. Box 1306, Evanston, IL 60204-1306, (847) 869-5016, e-mail: mfellis@enteract.com.

AWA REVIEW SUBMISSIONS: Tom Perera, W1TP, Editor, *AWA Review*, Box 122, Hancock, VT 05748, e-mail: tom@wltp.com.

ORDERS FOR *THE AWA REVIEW* OR BACK ISSUES OF *THE OTB*; COORDINATION OF SLIDE SHOWS: Edward M. Gable, 187 Lighthouse Rd., Hilton, NY 14468, (585) 392-3088.

WANT ADS: Richard Ransley, P.O. Box 41, Sodus, NY 14551, (315) 483-9307.

ANNUAL CONFERENCE BUSINESS: Hugh J. Davey, 32 Paula Dr., Long Valley, NJ 07853; (908) 850-9086; beagle2@sprynet.com.

FINANCIAL REPORTS: Randolph W. Haus, KB2PLW, P.O. Box 665, 6935 Rte. 227, Trumansburg, NY 14886; (607) 387-5293.

A.W.A. ELECTRONIC COMMUNICATION MUSEUM: Please see "Museum News" column for contact and administration information.

***OTB* STAFF**

Editor
Marc F. Ellis, N9EWJ

Design & Production
Claudia Gray Sweet

Copy Editor
Joseph J. Schroeder, Jr., W9JUV

Web Page Designer
Chuck Schwark

Advertising Mgr.
Robert W. Perry

CONTRIBUTING EDITORS

Amateur Radio
John Rollins, W1FPZ

Below 535
Frank Lotito, K3DZ

Book Reviews
David W. Kraeuter

Breadboarding
Dick Parks

Classified Ads
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The Communications Receiver
William B. Fizette, W2DGB

Equipment Restoration
D.K. Owens

Key & Telegraph
John Casale, W2NI

Mikes and Men
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The Museum
Ed Gable, K2MP

Obituaries
Charles Griffen, W1GYR

On the Internet
Chuck Schwark

Radio Reproducers
David Crocker

Television
Richard Brewster

The Vacuum Tube
Ludwell A. Sibley

ANTIQUE WIRELESS ASSOCIATION, INC.
BOX E, BREESPORT, NEW YORK 14816

The Old Timer's Bulletin is published approximately four times a year by and for members of the Antique Wireless Association, Inc. AWA is a nonprofit historical society founded in 1952 and chartered by the State of New York. *The Old Timer's Bulletin* is available through AWA membership. Its issuance is subject to change from time to time as to frequency, content, and size. It is not liable in any way for any buying-and-selling transaction entered into as a result of its content.

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FROM THE EDITOR

Most people who attended our 2003 Annual Conference seemed to have really enjoyed the experience. It was an unusually relaxed atmosphere, offering lots of time for renewing friendships with people who are no less our friends because we see them just once a year.

The weather cooperated beautifully, providing lots of sun and no clouds for the flea market—and there were many excellent finds to be made. I came home with everything on my want list—including parts, artifacts, and information gleaned from the tremendous pool of radio knowledge that assembles at Rochester every year.

The seminars and talks were lively and informative as usual. And I enjoyed the usual vigorous interchange of ideas at the "Moonlight Restorations" forum I host each year with the help of Restoration column editor Ken Owens and a rotating cast of AWA officers (this year, Past President Bill Fizette).

All this has put me in a very mellow mood, and I look forward to producing another year of *The OTB* — most especially the one for next August when we will announce the complete schedule for the 2004 Annual Conference!

LETTERS TO THE EDITOR

All letters to the Editor are read with interest and attention, though not all can be published in this column. Letters may be paraphrased, shortened or otherwise edited to fit the available space. The statements made by our correspondents are their own opinions and do not necessarily reflect the views of either the OTB *staff or the Antique Wireless Association.*

RESPONSE TO MARCONI LETTERS

Regarding Mike Tuggle's letter in the May, 2003 *OTB* and Bart Lee's letter in the August issue, I have an open mind about the possibility of Marconi receiving transatlantic radio signals in Newfoundland in 1901 at about 820 kHz during the day, but I remain skeptical. Given the choice between freak daytime (mostly) transatlantic propagation at that frequency, and unintended transmission at the HF end of the continuous spectrum of the spark transmitter, I choose the latter.

BBC broadcasts on the AM band do occasionally waft their way across the Atlantic at night, but I am unaware of such reception near the middle of the day. Regarding Mr. Tuggle's letter, there is a big difference between 910 km and 3500 km for such reception. Note that on his transatlantic voyage in 1902, apparently using a tuned receiver, similar detectors, and the same transmitter as in his 1901 Newfoundland experiment, Marconi received Morse code messages to about 1100 km from Cornwall in the day, but could only receive the letter "s" test signal at distances comparable to the Newfoundland experiment at night.

In his proposed 1.8 MHz transatlantic experiment with an Italian Navy type of detector, Mr. Lee faces one problem that Marconi did not have in Newfoundland; namely, a crowded radio spectrum!

HENRY M. BRADFORD
Wolfville, N.S., Canada

COMMERCIAL LICENSING IN THE 1940S

Ronald R. Thomas, in his "Licensed Commercial Radio Operators: The Forgotten Men Of Radio" (August issue), dealt with commercial licensing in the 1950s. Good enough, but I'd like to radiate some light on the practices of an earlier decade.

I was first licensed in 1943, and held both a First Class Radiotelephone and Second Class Radiotelegraph. Perhaps I was lucky, but I give more credit my instructors Venon N. Hook, W1EKU, his brother Melvin, W1CVG, and Leo DelAmico (call unknown), for giving me rigorous preparation. Without intent to be boastful, I never failed an FCC exam.

In the 1940s, our main references included *Radio Operating Questions and Answers, Practical Radio Communication,* by Nilson and Hornung, Ghirardi's *Radio Physics Course*, *The ARRL Handbook*, and *The Editors & Engineers Handbook* (referred to as "The West Coast Handbook"). The code exam for Restricted or Second Class Radiotelegraph was 16 WPM coded groups;

THE PRESIDENT'S MESSAGE

The 2003 Annual Conference is now just a memory. We all look forward to attending this event. It is the high point of the year, when we get to meet and renew old friendships or make new ones.

The conference ran very smoothly this year. We began by starting the Tuesday registration earlier than posted. This was an experiment to see if we could get rid of the five o'-clock check-in line. It worked great. Plan on seeing it again next year.

The membership forum was well attended and there were some lively discussions pertaining to the AWA and the museum. The seminars, too, were up to the expected level of excellence. Many thanks to all of the speakers. Without you there would be no conference.

I would also like to take this opportunity to thank all of our hard-working volunteers. Producing this event requires a lot of your time and energy. Without all of you, it would not be possible.

Next year's conference will be held on August 24 thru August 28, 2004 at the same location: the RIT Inn in Henrietta, NY. Mark your calendars now and get your vacation schedules set. Reservations will be taken at the RIT Inn starting in January. Call 585-359-1800. Hope you can make it to the 2004 meet. We look forward to seeing you there!

The next membership/board meeting of the AWA will held on November 9, 2003 at the RIT Inn. The membership meeting begins at 11:00 a.m., followed immediately by the board meeting. Members who would like to observe the board meeting are invited to attend.

As always if you have any questions or comments feel free to contact me. But please no calls after 9:30 p.m. (Eastern time), if possible.

Geoffrey Bourne
405 8th Avenue
St. Albans, WV 25177
(304) 722-4690
gcbourne@citynet.net

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for First Class, 20 WPM coded groups. These were equivalent to 20 and 25 WPM plain text, respectively.

If you passed the code plus elements I, II, and either III for Second Radiotelephone or V for Restricted Radiotelegraph, your amateur exam consisted only of ten questions on amateur rules and regulations. Not until I took the Extra Class exam did I take an Amateur code test, at 20 WPM, and theory exams. Again, passed on first try. Fond memories!

L. EDWIN RYBAK, W3QAG
Morrisville VT 05661-0753

MILLEN ENTHUSIAST

I really enjoy collecting Millen equipment and putting it on the air again. Here's a picture of what I've put together so far. From top to bottom, the rack-mounted items are: Model 90902 2" monitor scope (still in restoration), very scarce Model 90831 40 watt modulator, Model 90891 50 watt exciter/transmitter (circa 1955), homebrew power supply built by the original owner. The latter supplies filament, low and high voltages used by the transmitter and modulator. Just visible at left is the very scarce Model 90711 VFO.

The transmitter uses a 5763 to a 6146, and I was able to squeeze 30 watts out on 40 meters and about 20 watts out on 20 meters. There's a pesky chirp, possibly emanating from the VFO. that I'm in the process of troubleshooting and I hope to have that licked in time for the OT DX Contest.

GARY CARTER, WA4IAM
Reidsville, NC

RCA TO SPONSOR CW QSO PARTY

The Radio Club of America, founded 1909, was the first radio communications society to be

established in the world. The mission of the organization is to provide a forum for the exchange of knowledge, recognize outstanding achievement, provide financial assistance to deserving students, and preserve the history of wireless communications.

November 8, 2003 has been selected as the date for the first annual "Radio Club of America CW QSO Party." It will be an on-air gathering for members and guests (non-members) alike. We will use the 80 meter band, specifically, 3650 to 3700 kHz. Transmitter power to be limited to 100 watts output, more than adequate for even "coast to coast" work during the later hours.

Operate from 6 p.m. until 2 a.m. (Eastern Time) on Saturday evening. Exchange RST, QTH, name, equipment in use, etc. Any transmitter, receiver, or transceiver, antique, vintage, or modern is welcome. RCA members should sign their calls with a "slant bar" RCA. Example: W2ER/RCA.

This event will be a gathering for chat and fellowship, not a contest. Whether you operate at five or twenty-five words per minute, the idea is just to have a good time and increase awareness of the RCA and its missions.

"Radio Club of America" QSL cards will be available to all stations worked by member stations. Please submit a log so that we can send your card. My son Mike, W2ZE, will be QSL Manager. Please e-mail or mail logs to him at: Mike Raide, W2ZE, 21 Canandaigua Street, Shortsville, NY 14548 E-mail: mraide@rochester.rr.com.

BOB RAIDE, W2ZM, EVENT MANAGER
E-mail: rlraide@adelphia.net
Be sure to visit:
www.radio-club-of-america.org

SAVE THE DATE!
PERHAM SPECIAL EVENT
NOVEMBER 14, 2003 3:30-6:30 p.m.

Join us at History San José Collection Center for this behind the scenes look at the recently acquired Perham Collection of early electronics. The event will include a special book signing of *Charles Herrold, Inventor of Radio Broadcasting* with authors Mike Adams and Gordon Greb. Mike Adams is an award-winning documentary producer and Gordon Greb is a distinguished broadcast educator. Both will speak on early radio history.

You'll have the opportunity to tour the Perham Collection, recently moved from storage and unpacked after over 10 years of being out of public view. Included are early radios, TVs, test equipment, military equipment, computers, early products of Hewlett-Packard, Intel, Ampex, De Forest, Jennings, Atari, Federal Telegraph, Varian, Eimac and more.

Join us, too for a celebration of radio pioneer Charles "Doc" Herrold's birthday (Nov 16th).

For more information please contact:

Monica Tucker, Perham Project Coordinator, History San José, mtucker@historysanjose.org, 408-885-9512 x238.

1930S LIVING ROOM OPEN AT AMERICAN MUSEUM OF RADIO

The American Museum of Radio at 1312 Bay St. in downtown Bellingham, WA has now completed its 1930s Living Room exhibit. Visitors are invited to sit down in the exhibit and tune in historic programs on a 1936 Zenith radio set. Museum staff are always available to provide background about this period, when radio changed the world by providing a means for instant mass communication.

The American Museum of Radio has recently earned accolades from the prestigious Marconi Foundation and the national publication *Antique Radio Classified* for the scope and quality of its collection. Thousands of artifacts trace the dawn of the electrical age in the 1600s, through the invention of radio and into broadcasting's golden era in the 1950s.

The Museum also displays a Marconi Wireless Radio room, one of the few which has been restored to model the radio room on the ill-fated *Titanic*. Additional attractions include an authentic 1929 Theremin, the first commercial electronic musical instrument. Visitors are welcome to play the instrument and experience its magic first hand.

The American Museum of Radio is a nonprofit organization dedicated to the concept that learning about the past serves to better understand the present and prepare for the future. Regular hours are Wed.-Sat. 11 a.m. to 5 p.m. Tours are given by appointment to groups of students and interested. A $5 donation is appreciated for admission.

The American Museum of Radio will also feature its new exhibits and acquisitions during Bellingham's Downtown Gallery Walk from 7 to 10 p.m. on Friday, September 26.

For more information:
Call (360) 738.3886 or
visit www.americanradiomuseum.org.

AWA NEWS

***OTB* POLICY ON PROMOTING EVENTS:** The *OTB* is pleased to list the meets and meetings of any established antique radio organization, whether or not it is associated with the AWA. Do not send your information directly to the *OTB* Editor. Please send it to Joyce Peckham, Box E, Breesport, NY 14816. Closing date is six weeks prior to first day of month of issue.

Calendar of AWA Activities

NOVEMBER 7-9
VRPS Convention

NOVEMBER 9
AWA, Inc.
Membership and
Board Meeting

NOVEMBER 9
AWA Museum
Membership and
Board Meeting

AUGUST 17-21, 2004
AWA Annual
Conference

Calendar of Meets

(AWA logo identifies AWA-sponsored events)

VINTAGE RADIO AND COMMUNICATIONS MUSEUM OF CT

December 6

To be held indoors at the Museum, located at 33 Mechanics St., Windsor, CT. Contact: John Ellsworth, Museum Director, at radioclctr@aol.com or (860) 673-0518.

VRPS CONVENTION

November 7-9

29th annual convention of the Vintage Radio and Phonograph Society. The host hotel is the Hampton Inn and Suites located at 1700 Rodeo Drive, Mesquite, Texas 75149. Contracted rate of $69. Reservations via 1-800-HAMPTON. Events include four auctions, flea market, contest, seminar and banquet. For more info as it becomes available visit the VRPS web page at http://www.gbronline.com/radioguy/vrpsinfo.htm

AWA, INC. MEMBERSHIP AND BOARD MEETING

November 9

At Rochester Institute of Technology Conference Center, Henrietta, NY. I-90 Exit 46 to I-390 North to NY 253 West to NY 15 South. Membership meeting at 11 a.m. All members welcome. Board meeting follows.

AWA MUSEUM MEMBERSHIP AND BOARD MEETING

November 9

Same location as above. Membership meeting (all members welcome), followed by Board meeting, begins at conclusion of AWA, Inc Board meeting.

Recurring Meetings & Events

•Antique Radio Collectors of Ohio—meets first Tuesday of each month at 2929 Hazelwood Ave., Dayton, OH (4 blocks east of Shroyer Rd. off Dorothy Lane) at 7 p.m. Also annual swap meet and show. Membership: $10.00 per year. For more info, contact Karl Koogle: mail to above address; phone (937) 294-8960; e-mail KARLKRAD@GEMAIR.COM

•California Historical Radio Society—For info on current meetings, call the CHRS hotline: (415) 821-9800.

•CARS, the Cincinnati Antique Radio Society—Meets on the third Wednesday of each month at ITT Technical Institute, 4750 Wesley Ave., Norwood (Cincinnati) Ohio. For more information contact Greg Tierney, (513) 732-1844, or Bob Sands, (513) 858-1755.

•Carolinas Chapter of the AWA—Hosts four "mini-swap-meets" each year (in January, May, July and October) plus an annual conference, "Spring Meet in the Carolinas," on the 4th weekend in March. Executive committee meets approximately quarterly. For more info, visit the web site at CC-AWA.ORG or contact Ron Lawrence, KC4YOY, Chapter President, P.O. Box 3015, Matthews, NC 28106-3015; phone (704) 289-1166; e-mail kc4yoy@trellis.net

•Central Ohio Antique Radio Assn.—Meets at 7:30 p.m., third Wednesday of each month at Devry Institute of Technology, 1350 Alum Creek Rd., Columbus. (1-70 Exit 103B). Contact: Barry Gould (614) 777-8534.

•Cincinnati Antique Radio Society—Meets at 7:30 p.m., third Wednesday of each month, at Great Oaks Institute, Scarlet Oaks Campus, 3254 E. Kemper Rd., Sharonville, OH 45241. For info and directions, call Tina Hauke at (513) 771-8840.

•Delaware Valley Historic Radio Club—Meeting and auction begins 7:30 p.m. on the second Tuesday of each month. Location: Telford Community Center on Hamlin Ave. in Telford, PA. Annual dues: $15.00, which includes a sub-

scription to the club's monthly newsletter *The Oscillator*. For more info contact Delaware Valley Historic Radio Club, PO Box 5053, New Britain, PA 18901. Phone (215) 345-4248.

•The Downer's Grove (IL) Park District Museum sponsors a monthly "Collector's Hour." Participants have the opportunity to display collections at the facility for several weeks before making their individual presentations. The event is open to the public with no admission charge. The museum has also begun to sponsor a yearly "Collector's Fair." For more info, contact Mark Harmon, The Downer's Grove Park District Museum, 831 Maple Ave., Downer's Grove, IL, 630-963-1309, fax 630-963-0496, mharmon@xnet.com.

•Houston Vintage Radio Association—Meets second Tuesday each month (except Jan. and Dec.) at Lai Lai Restaurant, Tides II Motel, Houston Medical Center, Main and Holcombe Sts., Houston, TX. Meetings include auction/program, 7-10 p.m. Assoc. publishes *Grid Leak* quarterly, monthly activity announcements. Membership $15/yr. Write: HVRA, P.O. Box 31276, Houston, TX 77231-1276, or call Richard Collins, (713) 778-0721.

•Hudson Valley Antique Radio & Phono Society—Meets third Thursday of month, 7 p.m. Meeting, swap meet, and membership info: Peter DeAngelo, President, HARPS, 25 Co. Rt. 51, Campbell Hall, NY 10916. (914) 496-5130.

•Indiana Historical Radio Society—Meets quarterly in Feb., May, Aug or Sept and Oct. Flea market and Old Equipment Contest at all events. Auctions at all but Feb meet. The *IHRS Bulletin* has been published quarterly for the past 32 years. For meet details and information about the club and our Indiana Historic Radio Museum in Ligonier, IN see our Web site at www.indianahistoricalradio.org or contact Herman Gross, W9ITT, 1705 Gordon Dr., Kokomo, IN 46902-5977, (765) 459-8308, w9itt@mindspring.com

•London Vintage Radio Club—This Ontario, Canada club meets in London on the first Saturday of January, March, May, June and November. Annual flea market held in Guelph, Ontario in September in conjunction with the Toronto club. Contact: Lloyd Swackhammer, VE3I1A, RR#2, Alma, Ontario, Canada N0B1A0. (519) 638-2827. E-mail contact is Nathan Luo at lvrceditor@yahoo.com.

•Mid-Atlantic Radio Club—Meets monthly, usually the third Sunday of the month at the New Hope Seventh Day Adventist Church, Burtonsville, MD. Contacts: President, Geoff Shearer, 14408 Brookmere Dr., Centreville, VA 20120, e-mail gshea90278@aol.com; Membership Chair, Paul Farmer, (540) 987-8759, e-mail: oldradiotime@hotmail.com. Website www.maarc.org

•New Jersey Antique Radio Club—Meets second Friday each month, 7:30 p.m. Holds three annual swap meets. Contact (send SASE) Phil Vourtsis, 13 Cornell Pl., Manalapan, NJ 07726, (732) 446-2427.

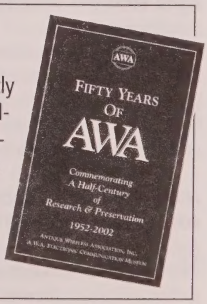
•Northland Antique Radio Club—hosts four events with swap meets each year (in February, May, September and November) including an annual conference, "Radio Daze," for two days in mid-May. Annual dues are $12.00, which includes a subscription to the club's quarterly newsletter. For more info, visit our web site at www.geocities.com/northland.geo/; contact Ed Ripley at (651) 457-0085; or write NARC, P.O. Box 18362, Minneapolis, MN 55418.

•Northwest Vintage Radio Society—Meets second Saturday of each month (except July and August), at or about 10 a.m., at Abemathy Grange Hall, 15745 S. Harley Ave., Oregon City, OR. Members display radios, exchange information. Guests welcome at all meetings and functions, except board meetings. For info, write the Society at P.O. Box 82379, Portland, Oregon 97282-0379.

•Oklahoma Vintage Radio Collectors—Oklahoma City Chapter meets second Saturday each month at Hometown Buffet, 3900 N.W. 63rd St.,

50th Anniversary Commemorative Booklet

Our 50th anniversary commemorative booklet *Fifty Years of AWA* was recently mailed out to all members. The publication has received high marks from almost everyone who has seen it. We still have a stock of this profusely-illustrated 60-page AWA history available for those who would like extra copies or those who were not members at the time of distribution and didn't receive one. Cost is $7.00 per copy postpaid, no limit. But once they're gone they're gone—so act now if you are interested! Send your check to Joyce Peckham, Box E, Breesport, NY 14816.



With the Chapters

CC-AWA CHAPTER NEWS

It's amazing. Here it is almost the end of September, Rochester has come and gone (I had to miss it again this year) and fall is just around the corner.

The Carolinas Chapter's Summer Swap Meet moved to a new home in late July. Richard Owens hosted the event in his hometown of Valdese, NC. The location was McGalliard Falls Park and it is a great site for a radio meet. There's lots of room for vendors and parking for shoppers.

There were 25-30 vendors and about twice that many shoppers, not bad for the first time in a new location. Richard did a great job of putting out signs to direct folks to the site and even got a big write-up in the local newspaper. We plan to do it again next year at the same location on the last Saturday of July.

Speaking of Rochester, I was really surprised when Robert Lozier sent me an email saying that he had accepted the 2003 AWA President's Award in behalf of the CCAWA. It was presented at the Friday evening banquet. Many thanks to AWA President Geoff Bourne for honoring our club with this award.

By the time you get this issue of *The OTB*, the second edition of the CC-AWA Journal "The Carolina Antenna" should be out. The first new edition was mailed to everyone that attended to Annual Conference, around 360 or so copies. The second issue will have considerably fewer copies since it will going only to dues-paying members of the chapter. Our crack editorial staff of Laura Carter, Lilburne Sheets, and Judy & Barker Edwards are doing a fine job.

The next event on our calendar is the Fall Swap Meet. It will be held in Greensboro/ Jamestown, NC on the 25th of October. It's always a great event, don't miss it.

As always, you can find full details of CC-AWA events and other activities by visiting our web page at cc-awa.org.

Happy Radio collecting,

Ron Lawrence, CC-AWA president.
PO Box 3015, Matthews, NC 28106-3015
704-289-1166(home)
kc4yoy@trellis.net (email)

Oklahoma City, OK. Visitors welcome. Dinner/socializing, 6 p.m.; meeting at 7 p.m. Membership, $12/yr., includes monthly *Broadcast News*. Info: SASE to OKVRC, P.O. Box 50625, Midwest City, OK 73140-5625; or contact Fred Karner at (405) 769-4656 or fkarner@cox.net; or visit our web site at http://members.cox.net/okvrc/

•Ottawa Vintage Radio Club—Meets monthly (except June and July) in the Conference Room, *Ottawa Citizen*, 1101 Baxter Rd., Ottawa, Ontario, Canada. Contact: Lea Barker at (613) 829-1804 or check www.ovrc.org. Membership: $10 Canadian/yr.

•Pittsburgh Antique Radio Society welcomes visitors to our Saturday flea market/contests in March, June, September, and December. An auction is included in September, and our annual luncheon/program is held the first Saturday in December. Our newsletter, *The Pittsburgh Oscillator*, is published quarterly. website: www.nb.net/~schaefer/pars.html For directions, specific dates, information call President Bonnie Novak at 412-481-1563 or write to Karl Laurin, 8111 Sally, White Oak, PA 15131.

•Society for Preservation of Antique Radio Knowledge—Meets at 7:30 p.m. the second and fourth Tuesdays of each month in the party room at Cassano's Pizza Parlor, 1700 East Stroop Rd., Kettering, OH. Membership, $18/year. Write SPARK Inc, P.O. Box 292111, Kettering, OH 45429; e-mail sparkinc@juno.com or call John Pansing at (937) 299-9570.

•Texas Antique Radio Club—Meets alternate months in Kyle and Shertz, TX. Contact: Ron Manning, President TARC, 133 East Huisache Ave., San Antonio, TX 78212. Phone (210) 734-6831; e-mail ronmeg@gateway.net; website www.gvtc.com/~edengel/TARC.htm

Service Sources Available

The AWA Source Sheet is a listing of parts suppliers and services for the radio collector. Cost: only a business-size self-addressed stamped envelope to AWA, Box E, Breesport, NY 14816.

AWA Slide/Video Program

The Antique Wireless Association has available several historical documentaries to loan to

affiliated organizations for club meetings and programs. There is no charge for this service other than return mailing cost. For info on loan conditions, to make reservations, or just inquire, contact Ed Gable, Curator, AWA Electronic Communication Museum, 187 Lighthouse Rd., Hilton, NY 14468. The following are available:

VHS VIDEO PROGRAMS

V-2 — "Electrons on Parade." 18 min. 1938 movie made at RCA's Harrison Plant showing production lines with closeups showing receiving tubes, including a short sequence on transmitting tubes. (Very rare movie.)

V-4 — "The British Receiver." Documentary of the AWA/BVPS meet with visit to Marconi's Chelmsford plant, the British Science Museum, and ending with series of collectible British receivers. (VHS program transferred from slides.)

AWA Nets

(EASTERN TIME)

PHONE

SUNDAY:
7244 kHz, SSB, noon (NCS:WA4IAM);
3837 kHz, AM 4:30 p.m.
NCSs:W2ZM & W2AN)

TUESDAY:
14274 kHz, SSB, 2:30 p.m. (NCSs: KC3YE and W0FXY)
3837 kHz SSB, 8 p.m. (NCS: WB2SYQ)

MONDAY-WEDNESDAY-FRIDAY:
The AWA Bruce Kelley HF Net
3867 kHz, SSB, 9:30 a.m.
(NCS: W2OBJ)

CW

DAILY, 4 p.m., 3588 or 7050 kHz. Protocol, informal. Check both frequencies for activity and join in, or call AWA de (your call) and see what you stir up. First WEDNESDAY of each month, 8 p.m., 7050 kHz

2-M REPEATER (Rochester Area)

MONDAY, 7:30 p.m. (NCS: K2GBR)
Receive 145.290 MHz
Transmit 144.690 MHz

AWA Life Memberships Are Now Available

Cost: $400 (U.S.), $500 (elsewhere)
Send your check to AWA Secretary Joyce Peckham, Box E, Breesport, NY 14816.
Phone (607) 739-5443.
E-mail:awapeckham@ aol.com.

V-5 — "The Early Years." Historical documentary narrated by Clarence Tuska telling of the early years of amateur radio, founding of the ARRL and WW I military radio training school. (VHS program transferred from slides.)

V-6 — "The Key." History of the telegraph/radio key covering early hand keys, semi-automatics and commercial types. Script by Lou Moreau, W3WRE. (VHS program transferred from slides.)

V-9 — "The Transatlantic Tests and 1BCG." Rare documentary/photographs showing early amateur operation leading to famous 1921 transatlantic tests.

V-12 — "Those Wonderful Magazine Covers." The story of radio through magazine covers. Colorful with period music.

V-15 — "The WHAM Story." Details development of a pioneer radio station in Rochester, NY. Program developed with assistance and recollections of Art Kelly, the station's former general manager.

V-16 — "The Charles Herrold Story." Video prepared by Mike Adams who donated this copy to the AWA. It documents the work of broadcasting's Forgotten Father who started broadcasting in 1912.

SLIDE PROGRAMS

S-1 — "Portrait of a Pioneer." The life of Elmo Pickerill.

S-2 — "Polar Adventure." Pictures taken by Bud Waite and his narration describing numerous trips to the Antarctic over a 35-year period.

S-3 — "70 Years of Vacuum Tubes." Describes the history of vacuum tubes.

S-4 — "The Early Years." (See description for V-5.)

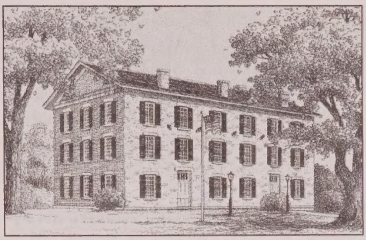
S-7 — "The Transatlantic Tests and 1BCG." (See description for V-9.)

S-8 — "Trip Through the AWA Museum" Covers exhibits and equipment.

S-12 — "The Key." (See description for V-6.)

MUSEUM NEWS

Visit us on the Internet at http://www.antiquewireless.org



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MUSEUM CONTACT

For all inquiries about the Museum and its operation, contact Edward M. Gable, Curator, 187 Lighthouse Rd., Hilton, NY 14468. Phone: (585) 392-3088, e-mail: k2mp@eznet.net.

The AWA. Electronic Communication Museum is an IRS 501(c)3 charitable organization.

From the Curator

Hello from your museum crew... and here's the news. Certainly not forgotten was the wonderful 2003 AWA Annual Convention. It was a real treat to have so many of you stopping by for a visit to your museum. There were several unannounced special treats (is this the start of a trend?) for those making the Wednesday night trip.

At the Annex one couldn't miss the wonderful military display put on by museum staffer Roy Wildermuth, W3RLW. Roy's theme was "Real Radios Run on Motors," and those in attendance were treated to the sounds of working radios, all running on their original dynamotors. A TCS-12, Wireless 19, T-195 and BC-348 were the main features of this display and the whirring dynamotors brought amazement to those uninitiated and revived memories for those who were at one time primary users.

Also brought out of long time storage, and in time for the conference Armstrong theme, was a REL FM Monitor receiver, once used at the pioneering FM station at Alpine, New Jersey, and a gift to the AWA by Armstrong's family. This unique receiver was carefully brought back to life by Duncan Brown, K2OEQ. I hope you had a chance to listen to this nice artifact as it played softly in the background of the service shop. Also on display was what some people claim to be the world's first transistorized transmitter. I rarely make such claims any more, but this one sure has a lot of convincing documentation and you can judge for yourself when it goes on permanent display next year.

This one night a year is a real highlight for your museum crew. It is also a time when many people make donations of hardware and/or software in the form of cash and checks. You were very generous this year and please do look at the list of donors elsewhere in this report.

Lots of other activity continues. A new upgrade to our PastPerfect software package makes it a much more user-friendly collections documentation tool. With that in hand, there will be more emphasis on improving progress on the five year program for cataloging our collection. Since the new software has a special section for books, and we have volunteers to do so, our library books will finally get the attention they so well deserve.

The software package sits on a new Dell PC which is networked to four other work stations. I need to acknowledge and thank Roy Wildermuth for his expert PC services and for his donation of PC network cards and a new network router for the Annex.

We're also taking advantage of the moderating outside temperatures to work in the tube loft. The loft, in reality the attic of the second building constructed on the Annex site, is a dandy spot to store thousands of tubes, but is often too hot or too cold to work in.

The task is to open all of those boxes, mostly TX and special purpose types, inventory them, test them when capable, and store them back in a defined location. Lots of work.

By the way, please be sure to look for the new and exciting offerings, from the AWA and the

museum, available just in time for Christmas. First, you must keep your collection complete and order a copy of AWA Review 16. This special Crosley edition features the eminent years of Powel Crosley, Jr., his life, products and the WLW story. You won't want to miss the story of early wireless pack sets and two other fine papers as well.

Next, we are pleased to announce the availability, in easy-to-use CD format, of the long out- of-print and much sought after Atwater-Kent story by Ralph Williams. It is otherwise known as AWA Review 12. Last but not least, AWA's dear friend Mr. Max Dehenseler, HB9RS, has authorized us to re-release his out-of-print *The Hallicrafters Story*, again in CD format. Max was a personal friend of Bill Halligan and tells the story of the man behind the legend in a way no one else can do.

Please look for more details on these items, as well as ordering information, elsewhere in this issue. Be sure to order early for holiday delivery!

Happy Holidays from your museum crew,

Ed Gable

Ed Gable, K2MP/W2AN
Museum Curator

RECENT MUSEUM DONORS

- Tom and Pat Saffen.....Philco 16 console
- William Kelly.....Antenna Rotor, tape players, more...
- Leatrice Kemp.....Silver Marshall RX, RCA SW Converter, Loop Antennas, RCA 2nd Harmonic Super, 2A3s, 250s, much more...
- Will Jensby.....Kilbourne & Clark quench gap transmitter with docs
- Thomas Peterson.....Panasonic Digital Oscilloscope, UX-199/120s NIB, more...
- Floyd Jury.....Nice example home brew Ham Superhet, 1930s
- Charles Stinger.....Type 851 Triode for Millen TX.
- Walter Zandi.....Freed Eisemann NR-9, Zenith Transoceanic in brown leather, more...
- Glenn Corsin.....Zenith 10S690 console. Nice
- Douglas Eldridge.....Andrea VK12 TV with Ch 1 and Armstrong FM
- Harland Ebert.....Admiral 6J22N table set
- Tom Perera W1TP.....1880s Telefunken Telegraph set
- Bob Arao.....NC-100ASD, TVs, RCA Tube Manuals, more...
- Ron Mansfield.....Books and DVD on transistor repair methods
- Steve Brown.....150 vacuum tubes, common RX type, 1950s NIB
- Mani Pires.....Collection of early A, B and C batteries
- Curtis Stromstad.....Philco Cathedral 37-34
- Ed Gable.....Sony CM-H888 Cell phone, 75 NIB 1930s tubes
- John Ross.....Tek scope, working
- Wayne Lightsey.....GRS, Tek and Meaurements test equipment
- Bob Raide W2ZM.....MIL Aircraft TX type ATB, NIB
- Stan Rubin N2GLA.....DX-100, Marconi 219, Knwd 2M FM, more...

Cash Donations:

Mr. Ayer
Mr. Frisbie
Mr. Gay
Mr. Holly
Mr. Leonard
Mrs. Marshall
Mr. Sadler

PHOTOS BY LARRY BABCOCK

THE 2003 ANNUAL CONFERENCE: ONE MAN'S IMPRESSIONS

By Larry Babcock

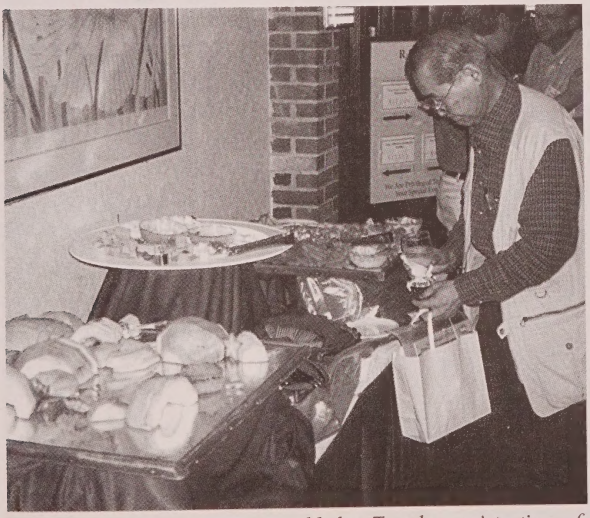
With Some Additional Material by the OTB *Staff*

When I registered for the meet this year, I thought there was a competing event in our space. There, near the registration desk, was a small bar and a nice spread of hors d'oeuvres including cheeses, fruits, dips, etc. What a pleasant surprise to find that this was for AWA members! A very nice touch added this year.

I decided to take a walk through the flea market area about 5:00 p.m. Tuesday before buying and selling was allowed. I saw Stan Avery, our security man, out there enforcing the policy. Our permit to sell was not effective until 6:00 am Wednesday. I did notice a nice DeForest D-7, with the loop antenna priced at $1,200. It was still there Wednesday. Also on Tuesday evening I attended Tom Perera's talk, "Inside The German Enigma Cipher Machine." Tom is a real expert on this subject and about 50 people attended this fascinating program.

I was in the flea market when it opened at 6:00 am Wednesday and immediately discovered that I didn't need my flashlight this year! Since the date was several weeks earlier than last year, it was already bright enough to see. The conference date was changed to avoid conflict with the beginning of classes at RIT, when fewer hotel rooms are available because many are used as student dorm rooms.

There were noticeably fewer people set up in the flea market this year but I talked with at least a dozen who told me that their sales were great. One of these was John Caperton, who drove up from Kentucky with a large trailer load. He told me Thursday afternoon that it had all sold except for couple of pieces.



Member's mixer, a new feature added to Tuesday registration, offered complimentary hors d'oeuvers. Cash bar was also available.

I saw a lot of nice things for sale. A Federal 57, VGC, was priced at $775 and on the same table was a beautiful Metro Electric cone speaker at $450. Ed Bell had a near mint BC-14, WW I aircraft spark transmitter for $1,300 and I later talked to the person who bought it. Rider's manuals were priced at $10-$12 each in several places. That's cheap! 01As were $10.

There was a large Federal

8095 CENTRE LANE, EAST AMHERST, NY 14051 • DOTLARRY@AOL.COM

Bart Lee presenting his program on the care of radio collectibles.

Orthosonic receiver with the horn speaker built into the lid for $450. I later noticed it had been reduced to $325. A beautiful three-piece Adams Morgan Paragon RA-10, DA-2 and 10R tuner was priced at $3,300. I also saw two Wimhurst high voltage generators. The 1900 model was $600 and the similar 1950s version was $300.

An extremely rare Atwater Kent Model 5 breadboard from the Muchow collection was being offered at $4,950. It later turned out that it was a repro built by Ralph Williams and the price dropped to $3,950. On the same table was a beautiful Zenith Walton table model priced $1,800. I later noticed it had been sold.

Don't ask me why but I have always wanted a Gibson Girl emergency transmitter. It automatically transmits an SOS signal when the handle is cranked. I paid $120 for a nice one complete with case, kite and accessories. I also purchased three Federal #27 rheostats. These each have three separate windings of different resistance wire in series so that about any type of tube from 1.5V to 5.0 V can be used.

Also among my purchases were a couple of 5"-diameter black cylindrical objects having seven binding posts and a Federal UV tube socket on top. They are labeled "Crystal Oscillator," and a switch on the side has three positions for 2,300 to 2,600 KC. With the UV socket it is probably from the very early 1920s, but my 1921 Federal catalog confirmed that Federal was not making this socket at that time. The seller had a large box full of these for $10 each.

By 8:00 a.m. I had completed my second round of the flea market. By then, about half of the spaces were open for business. The busiest time was between 9:00 and 10:00 a.m.. As usual, A free shuttle bus was provided to transport members from other motels to the flea market. However, quite a few members staying elsewhere told me that they had purchased flea market spaces just so they could park their cars on site. I also noticed that at 8:00 p.m. Thursday the parking lot behind the Inn was about full.

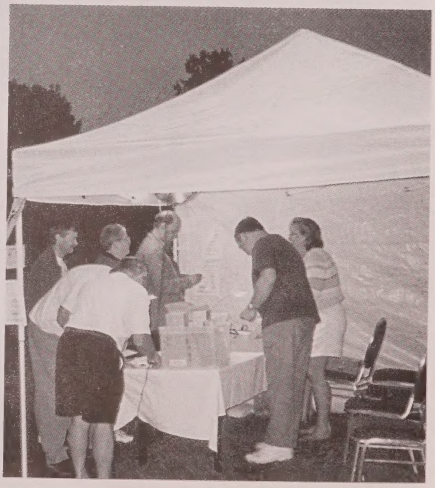
The auction scene began on Thursday evening, with the sale of vacuum tubes. The rest of the merchandise was sold on Friday. The entire auction ran about 5½ hours and brought in a respectable total of about $45,000! I thought that was quite good and the items I entered all brought good prices.

Walt Buffinton was the auctioneer and moved things right along. He was also very helpful in negotiating between with buyer and seller when the high bid was below the reserve. As a result, there were very few no-sale items. One exception was the last item up for sale, a Federal #61 with a $1000 reserve. I sold mine at the auction two years ago for $1,300.

This is a good place to sell your surplus artifacts. Keep it in mind for next year. The club now allows sellers to offer five items each of the three categories: tubes, paper and general radios.

At 11:00 a.m. Wednesday there was an AWA Membership Forum, where President Geoff Bourne reported that AWA membership is holding steady at about 3,500. He said we are now hold a trademark for our AWA logo and the search continues for a new museum building. He asked all members to help promote AWA and said the certificates are now available for all life members. The tedious task of making a catalog of all museum artifacts continues slowly. About 47 members attended this event.

The next program, on the preservation of radio ephemera, was presented by Bart Lee. It was well attended and much information was presented on the collection, proper repair and storage of papers related to radio. The other two



Because of our earlier conference date, it was already bright enough to see without flashlights when the flea market opened at 6 a.m. on Wednesday.

programs of the day, forums on telegraph issues and radio restorations, were hosted by Tom Perera and Marc Ellis, respectively. The usual lively discussions took place at both.

Thursday's programs were Early Television Development by Peter Yanczer, a conference theme paper (FM History) presented by Ludwell Sibley, an exploration of who invented the transistor by A.C. Sheckler, and a panel discussion on the status of radio museums by John Terrey.

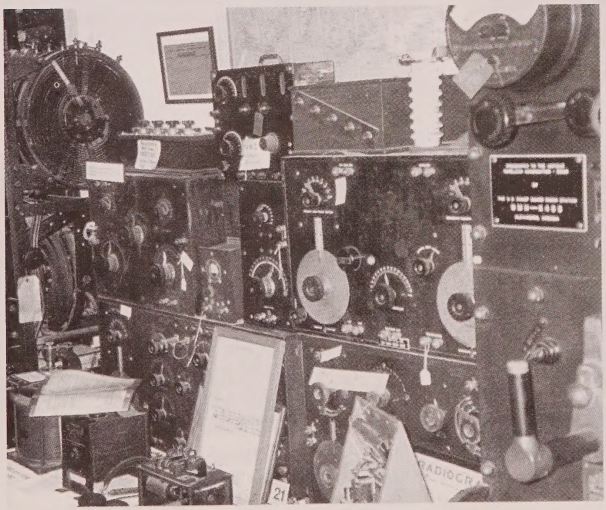
Friday's "Review of Amateur Operation," hosted by Tim Walker, standing in for John Rollins, provided a forum for discussion of past and upcomimg AWA ham events.

This Ralph Williams reproduction of the very rare Atwater Kent Model Five was priced at $3950. At left, a Zenith shutter dial "Waltons set."

Saturday morning's program offerings included a viewing of segments from Mike Adams' video series "Radio Collector," substituting for Dale Goodwin's "The Slide wire Bridge," We hope you'll be able to come and present it next year, Dale! Also presented was Lauren Peckham's ever-popular "Pre-1912 Apparatus," an informal "show and tell" session featuring apparatus brought in by the members. Included this year were some fascinating early motors and a magnetic wireless detector.

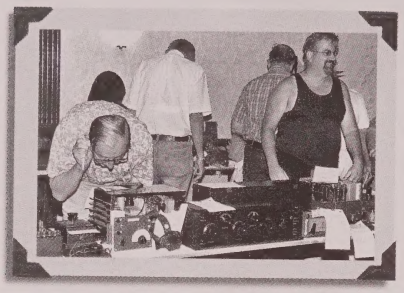
I was there for the entire five days and loved it. The banquet was excellent this year with about 200 attending. After the presentation of awards, we saw a very nice video-format slide show on the life of Edwin Armstrong narrated by Bruce Kelly. Following this everyone went to the contest area to view the many magnificent entries. The large room was full of artifacts of all types including many related to the conference FM theme. I noted a fine Leutz C-7 superheterodyne, a coherer detector, two very unusual horn speakers and a table full of WW I aircraft radio items.

The conference will be held at this same location, the R.I.T. Inn, next year. When you register ask for a room in the West Tower. It is the closest to the flea market area. Also plan to eat all of your meals right at the Conference. I found the food to be excellent and reasonable this year. My prime rib steak with all the trimmings was only $8.00. I know that only about a quarter of the AWA members get to the Conference each year but don't tell me that you live too far away to attend! I talked with visitors from Austria, Sweden and London, England. It wasn't too far for them! The rest of you will have to be satisfied to just read this article and learn what you missed by not coming!



Part of the extensive marine equipment collection at the museum.

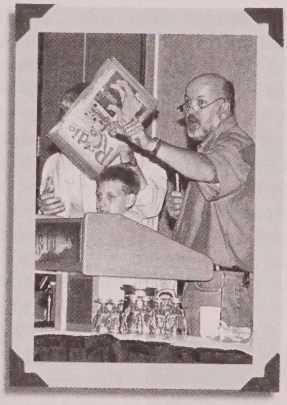
ANNUAL CONFERENCE CANDIDS

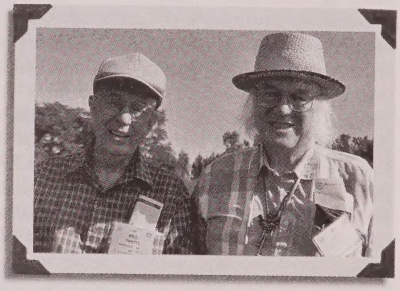


Careful shoppers scrutinize the lots at pre-auction viewing.

Host Tim Walker listens as Randy Haus reports on Contests during "Review of Amateur Operations" Session.

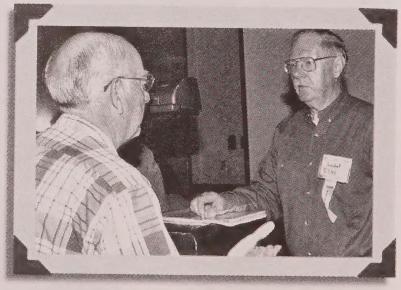
Auctioneer Walt Buffinton offers an item during the paper collectibles auction.





Ex-President Bill Fizette and Larry Babcock, both AWA board members, are obviously enjoying the flea market.

Ron Frisbie and Dick Brewster on a flea market walk-through.

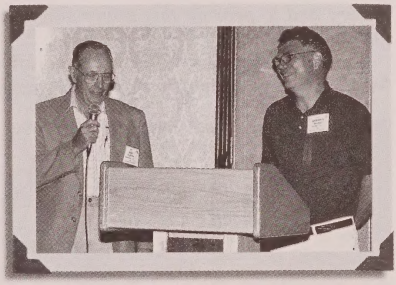


Will Jensby (left) asks Lud Sibley a few questions afer Lud's session on FM history.

Elinor Williams poses with the winner of the Ralph Williams Display Award: Louis Leonard's "British Mystery Crystal Set" exhibit.

Norm Hertz chats with Marsha and Jerry Simkin at their book fair booth.

Host Lauren Peckham helps Peter De Angelo show his magnetic wireless detector at the "Pre 1912 Wireless and Electrical Apparatus" session.



Past President Bill Fizette (left) with current President Geoff Bourne at the Finale Luncheon.

The arrival of John Caperton's U-Haul attracted a lot of interest at the flea market. He sold most of his load.

The George Freemans and Paul Bohlanders chat at the AWA awards banquet.

AWA Conference Awards Report

PHOTOS BY DICK RANSLEY

The AWA Recognition Awards

These awards are traditionally presented on the last evening of the conference at the gala "historical banquet." Nominations for the first six awards listed below are solicited from the AWA membership at large and each winner is selected by a special committee charged with administering that particular honor.

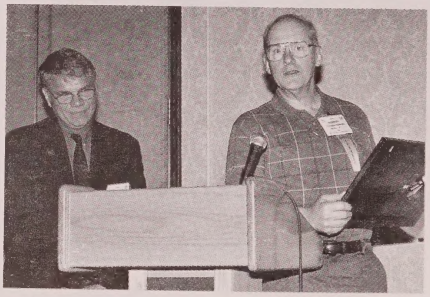
The AWA Houck Award for Documentation goes to an AWA member who has written several original articles on radio development or history in the *OTB, AWA Review*, or other publication. (This can include a book on a related subject.) *Winner: Bart Lee KV6LEE, For his tireless efforts to promote and document radio technical history and to provide this information to the general public.*

The AWA Houck Award for Preservation is for a member who, through personal accomplishment, has acquired, and preserved by documenting, an outstanding collection of radio artifacts. *Winner: Ron Frisbie, For his talent, time and devotion to the restoration of historically significant radio equipment and for his friendly, patient manner.*

The Bruce Kelley-OTB Award is given to the member who publishes in *The OTB* an article judged to be the most outstanding, original, historical presentation of the award year. For this year, articles in the August and November, 2002 and the February and May, 2003 issues were considered. *Winner: Henry M. Bradford For his excellent two-part article, "Did Marconi Receive Transatlantic Radio Signals in 1901?"*

The J. Albert Moore Award comes to us through the Antique Radio Club of America, which was merged into AWA a few years ago. The award honors Mr. Moore's contributions to

Bart Lee (right) receives Houck Documentation award from Houck Committee Chairman Barney Wooters.



Bob Lozier holds President's Award, which he has just accepted in behalf of the AWA Carolinas Chapter from President Geoff Bourne.

Tim Walker presents Linc Cundall Award to Parker Heinemann as President Geoff Bourne looks on.

Jan and Ron Frisbie display Ron's Houck Preservation Award.

ARCA. As given by the AWA, it recognizes the *OTB* article, or series of articles, deemed to be the most outstanding of those dealing with radio hardware (radio sets, radio systems or components) printed during the award year. The issues considered are the same as those considered for the Bruce Kelley-*OTB* Award. *Winner: Hugo Holden, For his excellent series on restoring a British HMV904 television receiver.*

The Taylor Award, in memory of John Taylor, RCA TV Developer, is for "preserving television history." *Not given this year.*

The Tyne Tube Award is presented, in remembrance of Gerald F.J. Tyne, for contributions to preserving or documenting the history of tube technology. *Not given this year.*

The President's Award for outstanding service to AWA this year: *Winner, Carolinas Chapter of the AWA for their outstanding contribution and dedication to the radio collecting hobby.*

The Linc Cundall Awards are presented to the winners of the Linc Cundall Memorial Old-Time CW Contest—Parker Heinemann, W1YG, 960 points—and the Linc Cundall DX Contest—again Parker Heinemann, W1YG, with 384 points.

2003 Old Equipment Contest Winners

Compiled by Contest Coordinator Geoffrey Bourne and Chris Bacon

THE THEME CATEGORIES (1-10)

Conference Theme: Frequency Modulation

Category 1. Prototype FM Equipment

1st: Bob Millard
Cathode Ray Frequency Modulation Tube

Category 2. Pre-War FM

1st: Ken Lowther
Prewar FM Articles

2nd: Ron McClellan
Brewster model B-10

Category 3. Early Two Way FM

1st: Marty Reynolds
Link Model BC 499A/SCR 294 2 way

Category 4. Postwar Commercial FM in the Home

1st: Frank Feczko
Three Zenith AM/FM Radios

2nd: John Garrison
FM in the Home Display

3rd: H. P. Bohlander
Philco 48-482

Category 5. Postwar FM Transmitters

1st: Chris Bacon
General Electric Phasitron Transmitter

2nd: Geoffrey Bourne
RCA BTE-10C Exciter

Category 6. Postwar Two-Way FM

No entries

Category 7. FM Innovations

No entries

Category 8: FM Takes Off

No award

Category 9. FM in Stereo

1st: John Garrison
Scott 3300/ LM 45

2nd: Marty Reynolds
Sarkes Tarzian FM Multiplex Radio

Category 10. Other Developments

No entries

Category 11. Armstrong

1st: Bill Holly
Armstrong letter to Lessing and Book

1st: Bob Schaumleffel
Armstrong and Sarnoff Letters

2nd: Jerry Simkin
Armstrong Biographical Material

3rd: Floyd Jury
Armstrong Alpine Antenna Display

Open Category

Special: David Kaiser
NRI 3" Television Kit

THE STANDARD CATEGORIES (12-25)

Category 12. Passive Receivers

1st: Louis Leonard
British Mystery Crystal Set

2nd: Merrill Bancroft
Homerad Crystal/Audion Receiver

3rd: Ron Frisbie
Marconi Coherer Replica

Category 13. 1920s Superhet Receivers

1st: Ken Blakeman
Leutz Model C with Model K Antenna Adapter

2nd: Ron Frisbie
Silver Marshall 1928 Laboratory Model

Category 14. 1920s Tuned RF Receivers

1st: Merrill Bancroft
Federal Model DX-58

2nd: David Cheney
Northern Electric Model R-50

Category 15. 1920s Regenerative and Reflexed Receivers

1st: Merrill Bancroft
Etherphone Model RX-1

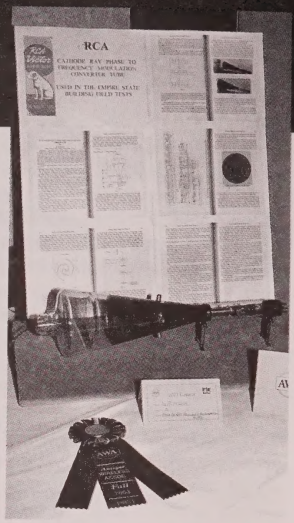
(continued on page 22)

Selected Blue Ribbon Winners

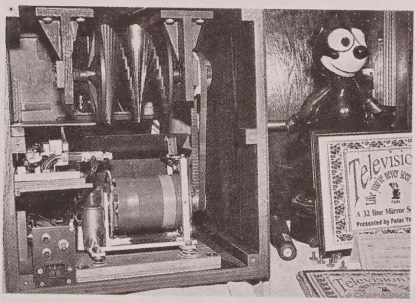
We wish we could show you all of the wonderful contest entries, but limited space allows us to show just a smattering. Here are twelve of the blue-ribbon winners that caught the photographer's eye.

Photos by Dick Ransley

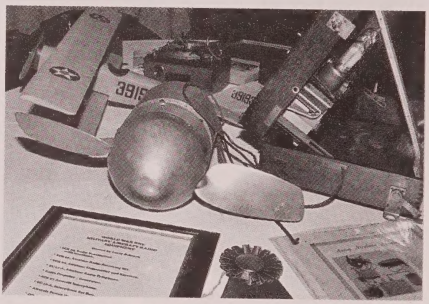
Three Zenith AM/FM radios won Frank Feczko the blue ribbon in the "Postwar Commercial FM in the Home" category.



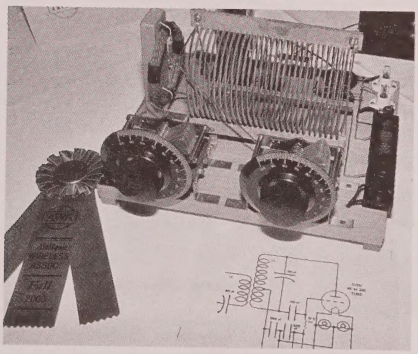
Bob Millard's FM cathode ray tube was used in Armstrong's Empire State Building tests. It won the blue ribbon in "Prototype FM Equipment."



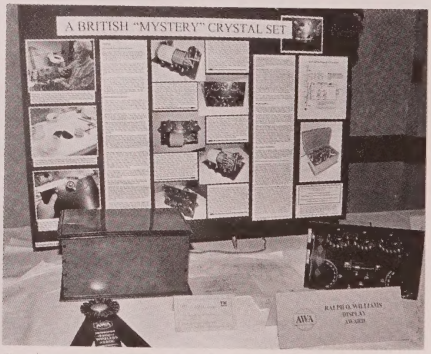
First prize in the "New or Rebuilt" category went to Peter Yanczer's 32 Line Mirror Screw Television, circa 1931.



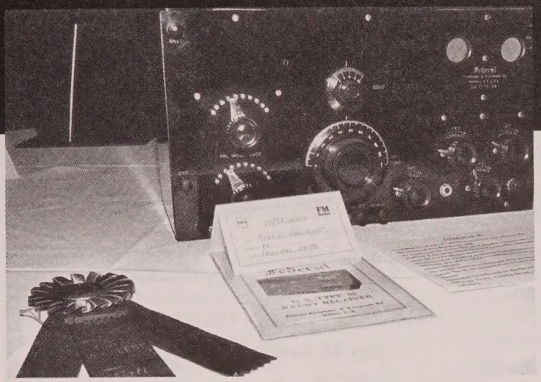
Larry Babcock's World War I aircraft radio gear took first prize in "Spark Transmitters and Artifacts."



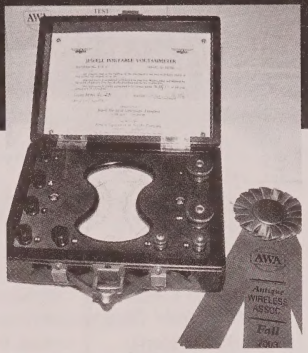
The blue ribbon in "Vacuum Tube Transmitters and Receivers" went to Paul Mooney's 1929 Hartley.



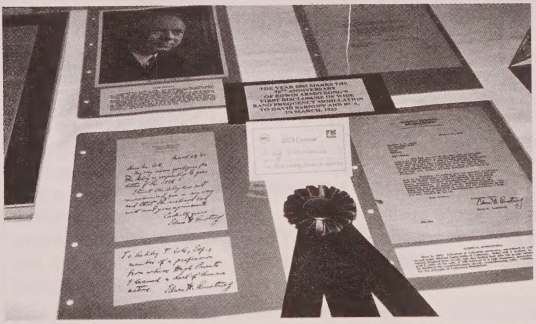
Top honors in "Passive Receivers" went to Louis Leonard's British Mystery Crystal Set.



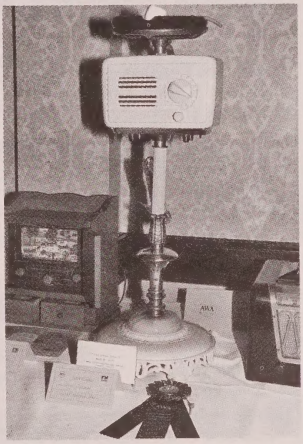
Merrill Bancroft's Federal DX-58 took top honors in "1920s Tuned RF Receivers."



Top honors in test equipment went to Ray Sieracki's 1929 Jewell Portable Volt/Amp Meter.



A display of Armstrong and Sarnoff Letters (pictured) By Bob Schaumleffel tied for First in the "Armstrong" category with a historical Armstrong letter entered by Bill Holly.



The blue ribbon for "Radios in Disguise" went to John Deloria's Electrolight Model 50-75 1947 Ashtray Radio.

Floyd Jury came away with a first in "Tubes" for his display of Early German Radar Tubes.

Judged best in the "Speakers" category was the Acme Kleerspeaker entered by Jim Wilson.

OLD EQUIPMENT CONTEST, *continued from page 19*

2nd: Ken Blakeman
RCA AR-1496-D

Category 16. Cathedrals, Tombstones and Consoles, 1930s and 1940s

1st: Robert Lozier
Philips Model 830A

2nd: Ken Lowther
Arvin Rhythm Baby Model 417

3rd: David Kaiser
Detrola Model T2

3rd: John Deloria
Ozarka Model 93

Category 17. Radios in Disguise

1st: John Deloria
Electrolight Model 50-75 1947 Ashtray Radio

2nd: Bob Schaumleffel
Smokerette Radio

3rd: Ken Lowther
Stewart Warner PortoBar Radio with original Glassware

Category 18. Speakers

1st: Jim Wilson
Acme Kleerspeaker

2nd: John Deloria
Art Andia Chinese Scribe

Category 19. Test Equipment

1st: Ray Sieracki
1929 Jewell Portable Volt/Amp Meter

Category 20. Tubes

1st: Floyd Jury
Early German Radar Tubes

2nd: Ludwell Sibley
Johnson Cathode Ray Tube Display

3rd: Bob Dobush
German Tube and Radio Book Display

Special: Bob Devel
Tube Chess Set

THE AMATEUR RADIO CATEGORIES (21-22)

Category 21. Spark Transmitters and Artifacts

1st: Larry Babcock
WWI Aircraft Radio Display

Category 22: Vacuum Tube Transmitters and Receivers

1st: Paul Mooney
1929 Hartley Transmitter

2nd: H. P. Bohlander
Homebrew Super-Het Receiver

3rd: Jim Francoeur
1928/29 MOPA w/ 27s

THE CRAFTSMAN CATEGORIES (23-25)

Category 23. Restoration of Appearance

No entries

Category 24. Restoration of Operation:

No entries

Category 25. New or Rebuilt

1st: Peter Yanczer
32 Line Mirror Screw Television Ca. 1931

2nd: Floyd Engles
Theremin Speaker

MAJOR CONTEST AWARDS

Eunice Thompson Best of Show Award

Bob Millard
Cathode Ray Frequency Modulation Tube

Elle Craftman Award

Floyd Engles
Theremin Speaker

Matlack Transmitter Award

Not given

Ralph O. Williams Display Award

Louis Leonard
British Mystery Crystal Set

Peoples Choice Award

Floyd Jury
Armstrong Alpine Antenna Display

CONTEST JUDGES

Chris Bacon
Ken Owens
Ken Lowther
George Freeman
John Garrison
Geoffrey Bourne

CONTEST COORDINATORS

Geoffrey Bourne
Chris Bacon

AWA Conference Auction Report

Sale prices for selected items from the AWA 2003 Conference auction records. Every attempt has been made to ensure accuracy in reporting these results, but the AWA cannot assume responsibility for any errors that may occur.

ADVERTISING ITEMS

READ RADIO "RADIO DIAL" PAPERWEIGHT, Excellent;	$150.00
VICTOR WOOD PACKING CASE FRONT;	$75.00
EVEREADY WOOD CASE FRONT SIDE, Good;	$45.00
SYLVANIA PLAYING CARDS, Good;	$25.00
STROMBERG-CARLSON DEALER SIGN, Fair;	$65.00
PHILCO RADIO ADVERTISING STAND, Good;	$110.00
ATWATER KENT GOLD & RED SHIP PICTURE, Good;	$250.00
KBOK RADIO STATION LOBBY SIGN, Excellent;	$80.00
"SCHICKERLING TUBES" POSTER, Good,	$17.50
MAGNAVOX ORIGINAL BROCHURE, Excellent;	$37.50

BOOKS AND MAGAZINES

HORN SPEAKER ISSUES, Good;	$15.00
RADIO GIRLS AT ROSELAWN, Good;	$25.00
HISTORY OF WIRELESS 2 BOOKS,	$155
RCA TUBE HANDBOOK 9 VOL, Good;	$42.50
AUDELS NEW ELECTRIC LIBRARY 11 VOL, Good;	$10.00
HAWKINS ELECTRIC GUIDE 10 VOL, Good;	$50.00
ANTENNA ENG HANDBOOK FIRST ED, HENRY JASIK, Good;	$190.00
ARRL RADIO AMATEUR'S HANDBOOK 1927, Good;	$100.00
SURPLUS RADIO CONV.MAN., EVENSON & BEACH, Good;	$15.00
ELEC. AND HOLES IN SEMICONDUCT, WILLIAM, Good,	$25.00
WRL CAT #16,	$35.00
OCEAN TELEGRAPHY, UNKNOWN,	$10.00
1997 CALL BOOK, UNKNOWN, Good;	$5.00
REV. JOSEPH MUGAS BIOGRAPHY, S. PALICKAR, Good;	$170.00
THE RADIO HANDBOOK 1936, FRANK JONES, Good;	$22.50
THE RADIO HANDBOOK 1937, FRANK JONES, Excellent	$25.00
ARRL RADIO AMATEUR'S HANDBOOK 1943, Excellent	$10.00
1922 RADIO, JOHN IRWIN, Good;	$5.00
DRAKE'S RADIO CYCLOPEDIA, Good;	$35.00
RADIO FOR EVERYBODY, LESCARBOURA, Good	$20.00
GERNSBACK 1918 WIRELESS COURSE, Good	$55.00
THE GREAT IRON SHIP, JAMES DUGAN, excellent	$25.00
RCA SERVICE DATA BOOK #1, Excellent	$45.00
ALLIED 1936 CATALOG, Good	$17.50
2 RADIO-CRAFT ISSUES, Excellent	$17.50
5 1940s RADIO-CRAFT ISSUES, Good	$5.00
THE CODEBREAKERS, KAHN, Good	$30.00
RADIO ENGINEERING, TERMAN 1937, Good	$5.00
2 TELEGRAPH BOOKS, Excellent	$10.00
MODERN LAND & SUBMARINE TELEGR, MACOMBER, Excellent	$55.00
1925, 1926 QST LOT, Good	$15.00
BOOK OF PHOTOS, RAYTHEON, Excellent	$25.00
RCA VICTOR SERVICE MAN, Good	$15.00
SAMS PHOTO FACT 71-90	$15.00
1899-1924 5 MISC PAMPHLETS, Excellent	$40.00
RADIO BOYS AT OCEAN POINT, CHARMAN, Good	$15.00
ELECTRONIC THEORY OF VALENCE, OXFORD	$10.00

COMMUNICATIONS EQUIPMENT

COBRA CB, Excellent	$30.00
HALLICRAFTERS S-40, Good	$40.00
HEATH DX-100 TRANSMITTER	$85.00
LAFAYETTE HA-600 RECEIVER & SPEAKER	$40.00
TEN TEK CENTURY 21, Unknown	$80.00
NATIONAL NC-300, Good	$110.00
HAMMARLUND MILITARY SP-200 (BC-1004), Fair	$100.00
HAMARLUND SPEAKER FOR SP-200, Good	$40.00
NATIONAL SPEAKER FOR NC-300, Good	$70.00
EDDYSTONE EC-958/3 RECEIVER, Excellent	$240.00
NATIONAL NC-183 RECEIVER, Excellent	$180.00
PATTERSON PR-15, Good	$400.00
RME 45-B, Excellent	$320.00
HALLICRAFTERS S-38A, Excellent	$45.00

CRYSTAL SETS

FEDERAL, Excellent	$450.00
AEG MODEL D, Good	$210.00
LE SANS FILS FRENCH CRYSTAL SET, Excellent	$275.00
STAR PEN CRYSTAL, Good	$135.00

MICROPHONES

ELECTRO VOICE MDL-624, Excellent	$340.00
ELECTRO-VOICE 635A PLUS TWO 623, Excellent	$27.50

MILITARY EQUIPMENT

T1154 TRANSMITTER, Excellent	$800.00
R1155 RECEIVER, Excellent	$550.00
GENERAL RADIO BC-14A, Unknown	$800.00

OTHER

BALDWIN TYPE C HEADSET- MICA DIAPHRAGM, Good	$35.00
H&K ELECTROMAGNETIC TOY ENGINE, Good	$230.00
HARPER'S WEEKLY SEPT 4, 1858, Good	$40.00
HARPER'S WEEKLY APR 20, 1872, Excellent	$47.50
NEWSPAPERS FROM 1927, Good	$30.00
SIGNAL QUACK MEDICAL DEVICE, Excellent	$60.00
EDISON EDIPHONE	$20.00
CROSLEY NOISE CANCELER, Unknown	$5.00
AUTOMATIC WIRE CHIEF TELEPHONE, Unknown	$22.50
MARCONI AT HIS DESK-1903, KEYSTONE VIEW, Excellent	$160.00
EDISON BATTERY, Excellent	$190.00
CHARLIE MCCARTHY RADIO GAME, Excellent	$20.00
MARCONI ENGRAVING, Excellent	$35.00
ATWATER KENT 2A CRYSTAL DETECTOR (REPRO), Excellent	$115.00
SEIBT WWI VARIABLE CAPACITOR, Good	$100.00

ACCESSORIES, BOSCH & OTHERS, Good	$15.00
WESTON MODEL 264	$11.00
EDISON EARLY PHONO RECORD, Good	$3.00
QUACK MEDICAL SPARK GENERATOR, FISCHER, Good	$35.00
WE 1900S INTERCOM STATION, Good	$140.00
COLUMBIA C-31 PHONOGRAPH, Excellent	$180.00

RECEIVERS

ADDISON ART DECO R5A1, Fair	$825.00
ATWATER KENT 725, Good	$180.00
ATWATER KENT #84 CATHEDRAL, Excellent	$460.00
ATWATER KENT 20D, Good	$115.00
ATWATER KENT MODEL 30, Good	$45.00
BECKMAN 905 WWV RECEIVER, Excellent	$30.00
BELMONT 6D111, Good	$55.00
BELMONT 636, Excellent	$50.00
CLARION AC-60 "JUNIOR," Good	$150.00
CROSLEY MODEL 5, Excellent	$85.00
CROSLEY 4-29, Excellent	$110.00
CROSLEY ACE TYPE V, Good	$90.00
CROSLEY ACE TYPE 3B, Good	$110.00
CROSLEY 51, Good	$80.00
CROSLEY PUP, Unknown	$330.00
CROSLEY MODEL 59	$500.00
CUTTING & WASHINGTON IIA, Excellent	$700.00
DAVID GRIMES #452, Good	$100.00
DEFOREST-CROSLEY 6D531, Good	$175.00
DEFOREST D-10, Fair	$475.00
DEFOREST D-7A & ANTENNA, Good	$1,000.00
DETROLA T-2 W/MOTOR TUNING, Excellent	$475.00
EMERSON MODEL 539, Excellent	$37.50
FADA PIANO RADIO, Good	$260.00
FREED EISEMANN NR6, Good	$90.00
GENERAL ELECTRIC MODEL 410, Good	$22.50
GILFILLAN MODEL 5F, Excellent	$70.00
GREBE SYNCHROPHASE MU1, Good	$235.00
GRUNDIG 4570-V, Excellent	$35.00
GRUNOW TYPE 5B, Excellent	$140.00
GRUNOW SHIRLEY TEMPLE MODEL 1291, Fair	$165.00
KELLOGG MODEL 507 RECEIVER, Excellent	$50.00
LEUTEZ SEVEN SEAS, Excellent	$110.00
MARCONI TUNER WITH MANUAL, Excellent	$5,500.00
MEISSNER 112, Excellent	$30.00
MONARCH, Good	$110.00
NATIONAL NC-125 W/ MATCHING SPEAKER, Excellent	$310.00
NATIONAL MODEL 571, Good	$32.50
NEUTROWOUND MODEL 1927, Good	$330.00
NEUTROWOUND, Fair	$160.00
NORTHERN ELECTRIC MODEL B4100, Good	$45.00
PHILCO 70, Excellent	$290.00
NORTHERN R3, Excellent	$1,250.00
PHILCO 71, Excellent	$160.00
PHILCO 50-A, Poor	$80.00
PHILCO MOD 54, Fair	$45.00
PHILCO MODEL 51, Good	$100.00
PHILCO TABLE 42-340, Good	$45.00
PHILCO MODEL 70 CATHEDRAL, Excellent	$200.00
PHILLIPS B4X79A, Excellent	$60.00
PIONEER BINAURAL AM-FM RECEIVER, Good	$80.00
PITTSBURG 3P2, Fair	$300.00
PREISS STRAIGHT 9, Excellent	$500.00
RCA 103 SPEAKER, Poor	$30.00
RCA 6BT6, Good	$70.00
RCA RADIOLA 46, Excellent	$110.00
RCA MODEL AR-812 SUPERHET, Good	$140.00
RCA MODEL AR-812 SUPERHET, Good	$140.00
RCA RADIOLA III	$50.00
REPLICA LOOSE COUPLER, Excellent	$50.00
SCOTT PHANTOM DELUXE, Fair	$400.00
SILVERTONE 1850, Excellent	$95.00
SONY TR72 TRANSISTOR (1952), Fair	$90.00
SPARTON 558, Excellent	$2,500.00
TELEFUNKEN BAJA220, Excellent	$30.00
THOMAS TPC-109 MIRROR RADIO, Excellent	$130.00
KELLOGG MODEL 507 RECEIVER, Excellent	$50.00
TUSKA MODEL 224, Good	$180.00
TUSKA TYPE 301, Good	$95.00
TUSKA 225, Excellent	$360.00
UNKNOWN SHIP RADIO, Good	$200.00
ZENITH 638 6G001YXZ1, Good	$85.00
ZENITH 10A2R,Unknown	$45.00
ZENITH 3000-1, Excellent	$80.00

SPEAKERS

ATWATER KENT HORN SPEAKER, Good	$55.00
BURNS HORN SPEAKER, Good	$500.00
STROMBERG CARLSON MODEL 14, Good	$130.00
GE UK GEKOPHONE HORN SPEAKER, Excellent	$170.00
WESTERN 7288, Good	$575.00
RCA MODEL 100, Good	$32.50
AMPLION "DRAGONFLY," Excellent	$1,600.00
DEFOREST/CROSLEY MUSICONE, Good	$95.00
ATWATER KENT TYPE J, Poor	$5.00
BURNS WOOD HORN SPEAKER, Good	$150.00
SCOTT TAUSCHER SOUND BOARD	$400.00

TELEGRAPH

BUNNELL MANY TYPES Good	$110.00
BRELCO NY WWII TELEGRAPH LEG KEY, Excellent	$30.00
LES LOGAN MODEL 501 BUG, Good	$42.50
EF JOHNSON BUG, Excellent	$130.00
MCELROY CODE MACHINE, Good	$35.00
VIBROPLEX PRESENTATION, Excellent	$200.00
SILVERTOWN TELEGRAPH KEY, Good	$800.00
AUSTRIAN STANDARD KEY, Good	$100.00
SIGNAL CORPS AIRCRAFT TRANSMITTER, Excellent	$925.00
WESTERN UNION 3 ARM SOUNDER BOX, Good	$110.00
UBKNOWN "STRAP KEY," Good	$17.50
MCELROY MODEL 300, Good	$80.00
CROWFOOT WET BATTERY	$30.00

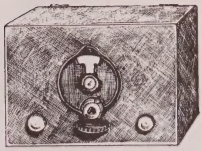
TEST EQUIPMENT

EICO 315 SIGNAL GENERATOR, Good	$10.00
SUPREME RADIO DIAGNOMETER MODEL AAA-1, Good	$60.00
MILLEN GRID DIPPER 90651, Good	$30.00
SUPERIOR TV-11 TUBE CHECKER, Good	$20.00

(continued on page 26)

AMATEUR RADIO

EDITED BY **JOHN F. ROLLINS, W1FPZ**, HC 33, BOX 150, ARROWSIC, MAINE 04530
PLEASE INCLUDE SASE FOR REPLY.



Upcoming Events

Fall is in the air and it is time to dust off those old relics and make sure they will run. Also, for those procrastinators, it's time to get going and start that new old-time radio project for the winter QSO season. For the newcomers, I again make the offer to help you out with parts or by making the necessary coils for your project. As with every year, I hope for a good turnout, good weather, and no QRM!

Rules and dates/times for the winter tests are listed below. Logs and information sheets will be sent out about 10 days before each event. My listings pertain only to the Bruce Kelley 1929 QSO Party and the Linc Cundall Memorial Old-Time CW Contest. But keep reading after my announcements, and you'll see Randy Haus' news about a reconfiguration planned for the "30s Night" contest that he and Marc Ellis, our *OTB* Editor, tried out last year.

Be sure to watch for the February issue of *The OTB*, when Randy will post announcements for both the new contest and the Linc Cundall DX contest to be held in April.

Bruce Kelley 1929 Memorial QSO Party

This year, the Bruce Kelley 1929 QSO Party is scheduled for the first week in December.Take care to note that the first weekend activity will actually start on Saturday, November 29, with the second activity session starting on Saturday, December 6. Participants are urged to send in their logs early. I have to meet the end-of-December deadline set by our editor.

•*Dates and Times:* Saturday Nov. 29 – Sunday Nov. 30 and Saturday Dec. 6 – Sunday Dec. 7. Start 2300Z (6:00 p.m. EST) and finish at 2300Z (6:00 p.m. EST), both periods.

•*Objective:* Contact as many other AWA members as possible. On contact, exchange RST, name, QTH (state), type of transmitter, year and power. Note the addition of your QTH (state).

•*Rules:* Transmitters must be 1929 or earlier types of self-oscillators, such as the Hartley, TNT, PP tuned grid tuned plate, MOPA etc. Participants are encouraged, but not required to use straight keys.

•*Power:* Transmitters are limited to a power input of 10 watts or less. However, between the hours of 0500Z (12 p.m. EST) and 1300Z (8 a.m. EST), power may be increased to 20 watts to help make E-W contacts.

•*Frequencies:* Operate for this '29 QSO Party will be between 3550 KC and 3580 KC.

•*Logs:* Send all logs to John F. Rollins, 21 Bald Head Rd., Arrowsic, Maine 04530.

Linc Cundall Memorial Old-Time CW Contest

The annual Old-Time CW Contest will be held during the last week in January, and the equipment will be anything from 1946 or earlier.

•*Dates and Times:* Start at 6 p.m. EST (2300Z) on Wednesday, January 28 and end at 6 p.m. EST (2300Z) on Thursday, January 29. Repeat on Saturday, January 31 through Sunday, February 1.

There is a major change in the times and scoring for activity in the 160 meter band. Contacts will be limited to the first period (Jan. 28 – Jan 29). In addition, the scoring method for this activity has been changed. Scoring for 160 meters will be 3 points for an E to E, or W to W QSO. An additional 2 point multiplier will apply for E to W or W to E, and 3 points for DX. All other scoring will remain as always.

•*Objective:* Contact the greatest number of AWA members. When calling, use (for example) "AWA AWA de W2AN". On contact, exchange signal report, year of equipment, such as "TX 36" for a 1936 transmitter and "RX 34" for a 1934 receiver. Send "MOD" for modern (after 1946) gear.

•*Rules:* A station will be scored only once on each band. Non-member contacts, and stations not submitting logs, will not count.

•*Frequencies:* 1800-1820, 3550-3580, 7030-7050, and 14060-14070 kHz ± QRM. Concentrate 20 and 160 meter contacts on the hour.

•*Scoring:* QSO Zones: "E" eastern zone US Districts 1, 2, 3, 4, 8, 9 plus VE1 VE2, and VE3; "W" western zone, US Districts 5,6,7,0 plus VE4, VE5, VE6 & VE7. "DX" zone: All others.

•*QSO Points per Contact by Zone:* "E" to "E" or "W" to "W" 1 point; "E" to "W" or "W" to "E" 2 points; "E", "W" or "DX" to "DX" 3 points.

•*Equipment Multipliers:* MOD TX *and* RX=1; OT TX *or* RX=2; OT TX *and* RX 3.

•*Power Multipliers:* input to final up to 4.9 watts=4; 5-24.9 watts=3; 25-100 watts=2; 100+ watts=1.

•*Determining Total Points per QSO:* (1) Find QSO Points for contact. (2) QSO Points X your equipment multiplier × your power multiplier = total points for the contact.

•*Scoring Examples:* **Example 1**, KB2PLW contacts W1FPZ; (a) both are in "E" zone for one QSO point; (b) both have OT TX and RX for a 3 multiplier; (c) both are operating at 10 watts for a 3 multiplier. Therefore the contact is worth 1 pt × 3 × 3 = 9 points for the contact for each operator. **Example 2,** W6TDP contacts W2FCH; (a) "W" to "E" contact counts as 2 QSO points; (b) W6TDP has OT RX and OT TX running 20 watts; (c) W2FCH has MOD RX and OT TX running 50 watts. Therefore the contact is worth 2 × 3 × 3 = 18 points for W6TDP and 2 × 2 × 2 = 8 points for W2ER.

•*Logs:* Send all January OT Contest log results to John F. Rollins, W1FPZ, 21 Bald Head Rd., Arrowsic, Maine 04530.

"30s Night" to become an Old-Time A.M. Contest!

By Randy Haus and Marc Ellis

The "30s night" contest we tried out last year attracted a lot of attention, and we decided to run it again this year with a few important modifications. To simplify the scoring and make it consistent with the scoring systems used by our other contests, we decided to restrict operation to a single mode. The difference is that the mode will be A.M.!

Up to now, with the exception of last year's "30s Night," A.M. had not been used in our ham contests. Now (assuming your continuing interest warrants it) A.M.'ers can have an "OT" contest of their own. Receivers and transmitters will be consdered to be "OT" if manufactured prior to 1940 or homebrewed using circuits introduced pror to 1940.

Check our February issue for complete details on the new contest, but don't wait until then to begin preparing your vintage rigs! The contest will probably be scheduled in March. Also in the February issue, of course, will be full info on Randy's "Linc Cundall DX contest" to be held in April.

AUCTION REPORT, *continued from page 24*

TRANSMITTERS	
E.F. JOHNSON VIKING RANGER, Excellent	$2,250.00
HEATHKIT HG-10 VFO, Good	$60.00
TUBES	
UV-201 BRASS BASE TIPPED, Excellent	$110.00
2-45s 2-80s 1-27; Good	$22.00
RADIOTRON UX-199s	$40.00
ARCTURUS "A" 6 PIN 2.5 V FIL, Excellent	$38.00
RAYTHEON RK707B, Excellent	$3.00
WE 216A, Good	$55.00
AMPEREX 212E	$9.00
W 216E, 205E, Poor	$45.00
WESTINGHOUSE WL-678, Good	$1.00
KELLOGG 401 AC TUBES, Good	$50.00
GOLD SEAL; UV-201 TIP 2 PCS, Good	$26.00
RCA 210 GLOBE Excellent	$45.00
WW2 MAGNETRON	$75.00
GE X RAY TUBE	$80.00
SYLVANIA SX250 GLOBE, Good	$50.00
RCA ICONOSCOPE 1850A	$330.00
WE TYPE 274B, Excellent	$130.00
DUOVAC VT-2, Excellent	$65.00
MARCONI V-24 TUBULAR	$110.00
GE PJ2	$25.00
TUBULAR AUDION W/BRASS FIXTURE	$95.00
MULLARD MISC RED TUBES	$5.00
CX 301-A (2) & 201A	$6.00
TELEFUNKEN RV 2500, Good	$30.00
LOEWE 3 NFW, Good	$200.00
ROICE 5 WATT OSCILLATOR, Excellent	$75.00
PHILCO 5 TYPE 27, Excellent	$13.00
WESTINGHOUSE WL 481-B (TWO), Good	$6.00
ELECTRO MATIC EMB20/7820, Good	$30.00
NATIONAL 5684/C3HA THYRATRON	$30.00
RADIOTRON UX245 (TESTED VG), Good	$32.00
RCA 5826 IMAGE ORTHICON	$16.00
WESTINGHOUSE WD-11 TUBES, Good	$120.00
RCA UX-210	$35.00
SILVERTONE TWO 201A TRIODES, Good	$30.00
TUNG SOL 2 EACH 6AR6	$4.00
4 ARCTURUS 24, 4 MISC. 27, Good	$10.00
TUNG SOL 6AR6, 2 MATCHED PAIRS, Good	$6.00
WESTINGHOUSE 6L6GC, MATCHED PAIR	$10.00
SODION D-21	$20.00
WD11	$105.00
6 UV199	$50.00
8 UX 199	$55.00
3 NOS UV 199	$50.00
5 EA 6336 DUAL TRIODE	$5.00
ARCTURUS 6SD7GT (2)	$9.00
WESTINGHOUSE WL531, Poor	$23.00
CROSLEY 551	$11.00
201A BRASS BASE	$20.00

RADIO REPRODUCERS

EDITED BY **DAVE CROCKER**, 35 SANTUIT POND RD., #4B, MASHPEE, MA 02649
PLEASE INCLUDE SASE FOR REPLY.

The Mozart and Remo Horn Speakers

The Mozart "Baby Grand" speaker was manufactured by the Mozart Grand Co. of Newark, New Jersey. It was a low-profile "reentry" type of speaker, where the sound from the reproducer was slightly amplified through a tapered horn and "bounced" off the rear of the bell enclosure. The sound was then reverberated outward towards the wider bell opening.

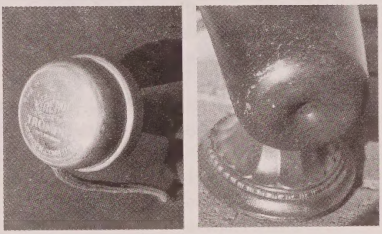
The Mozart 11¼" bell was of spun aluminum and bolted at an upward angle to a heavy, cast metal base. The finish, overall, was black "crackle" over gold. The cord leads were screw-attached to the front of the Mozart reproducer.

The Remo "Trumpet" was also a re-entry horn of low profile design, a mere 1" taller than the Mozart. It was produced by the Remo Corp. of Meriden, Connecticut. Its spun aluminum bell is exactly the same as the one on the Mozart, which leads me to believe that both the Mozart and the Remo purchased their bells from the same supplier.

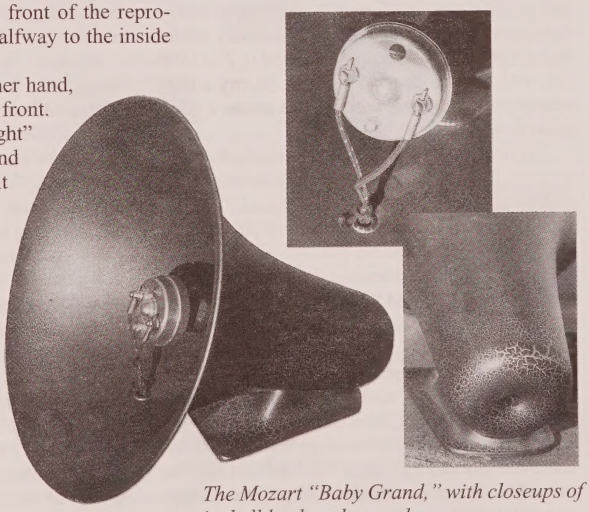
The Remo's base is also of cast metal, but of a different and heavier design. This speaker is painted a deep red with dark brown/black highlights. The name "Remo Trumpet" appears on the front of the reproducer, and its cord exits almost halfway to the inside rear of the bell.

The Mozart's wires, on the other hand, exit the bell much closer to the front. Mozart also produced four "Upright" horns. These were 9", 10", 12" and 14" tall. All were of the straight neck design.

In addition to the "Trumpet," Remo marketed a tall gooseneck horn called the "Trumpet Sr." and a mahogany cabinet type called the "Remola Concert." While both the Remo and the Mozart have that "tinny" sound, both are unique-looking and valued additions to any collection.

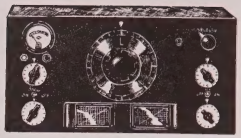


The Remo "Trumpet," with closeups of its bell back and reproducer.



The Mozart "Baby Grand," with closeups of its bell back and reproducer.

THE COMMUNICATIONS RECEIVER



EDITED BY **WILLIAM FIZETTE, W2DGB**, RR 1, BOX 55, HENRYVILLE, PA 18332
PLEASE INCLUDE SASE FOR REPLY.

The Remarkable National SW-3

The descriptive term "remarkable" is often used carelessly. But when it is applied to a little stripped-down regenerative receiver, born in the cash-scarce years of the early 1930s, which had a 14-year production run of over ten thousand units, which was used worldwide in all sorts of applications and environments, and which is now a sought-after collector's item, the word is well chosen.

A number of communication receivers from the "golden age" have accumulated a substantial body of literature. The SW-3 is certainly one of them, and my file is replete with numerous articles from *CQ, QST, Electric Radio, The OTB*, and other publications. Noteworthy among these is the landmark *QST* article by Jim Millen, (then W1AXL and later W1HRX) (1) the two papers in *CQ* by Bill Orr, W6SAI (2), (3), and a superb article in *Electric Radio* by my fellow National enthusiast Jim Hanlon, W8KGI (4).

There are other delightful and informative articles by Faulstick (5), in *Riders Manuals* (6), in various National Company instruction manuals, and by Ruggere and Troe (7). Additional information on the coils, as well as a summary of the various power supplies, can be found in *The OTB* (8), (9). There are, of course, many other sources, but the above will give the reader a good overview.

Physically, the SW-3 in its various models is an ugly little black steel box with a hinged lid and a longest dimension of less than 10". It has four front panel controls. There are three tubes, with two plug-in coils for each frequency range. The power source is external: batteries or certain of the famed National "doghouse" AC supplies.

Background

The National Company began as a manufacturer of radio parts, and in time produced finished products using those parts. Thus, the SW-3 with its plethora of interesting features did not just suddenly emerge from the National laboratory. There was a considerable prior development history that included the distinctive tuning capacitors, the unique dial and knobs, the 5880 "doghouse" power supply (with a circuit that eliminated "tunable hum"), and especially the distinctively-based National R-39 low-loss plug-in coils. (NOTE: The question is frequently posed as to why National didn't use the standard six-pin tube base; the answer is simply that their version was designed first.)

One prior product was the 1930 SW-5 five-tube "Thrill Box." It was a deluxe short-wave radio housed in an ornate metal cabinet and using grooved R-39 plug-in coil forms. The SW-5 sold for $85.00, and the 5880 AB power supply cost an additional $20.00.

Driven by the adverse economic conditions of the deepening Depression, James Millen's National design group stripped the SW-5 circuit of everything not essential for communications use while keeping the fundamentals in place. They removed the power audio amplifier (the user would now need headphones), replaced the tuning capacitor's fancy drum drive with the much cheaper Type C dial, and changed the capacitors to an in-line configuration. The cabinet was now a simple, uncomplicated steel box with a hinged lid.

In short, the Millen group produced a very basic radio for a relatively low price, which the user could supplement with additional coils, an audio amplifier, and so forth as money permitted. Wholesale Radio Service Co. in New York listed the set at $32.34. The price included three sets of amateur-band coils, but not the tubes. This was considerably less than the cost of the SW-5, and much more in line with prevailing economics. The price of the matching #5880 power supply was $20.30, essentially unchanged.

The full-page introductory ad for the SW-3, reproduced here, appeared in the October 1931 issue of *QST*. This, of course, followed directly on the September *QST* article mentioned above, and is an excellent example of the sophistication of National marketing strategy under Millen's guidance. Another example, of course, is the offering of accessory coil sets covering a wide range of frequencies. Who could resist spending

a few dollars now and then for coils that opened up new listening possibilities?

The Circuit of the SW-3

The three-tube SW-3 circuit includes an r.f. stage, a regenerative detector, and a single audio amplifier. There were eventually three versions, referred to now as Models I, II, and III. Model I is scarce today. Model II debuted about 1936. It is the one mostly found today, and is the subject of my restoration column elsewhere in this issue. See that column for a copy of the schematic.

The Model III, designated SW-3U, "The Universal," was manufactured in limited quantities in the late 1930s and up through 1945. It was designed to use either 6-volt metal tubes or 1.4-volt battery tubes. There are not many Model IIIs around today.

While the tubes and some of the components and circuitry varied somewhat as different versions of the SW-3 emerged, the basic circuit remained constant, as did the external appearance. One minor exception to the external appearance differentiates the first model from the succeeding versions; the lid of Model I is flat, while the later models has a raised finger lip in the front center. Also, looking down inside the Model I with the lid raised, the two-section tuning capacitor consists of two National type SE-100s ganged with an insulated coupler, and held to the chassis with four screws. Subsequent versions used a dual National 2SE-100 mounted with a special bracket in the rear, and directly to the main dial drive, a National Type C, in front.

The S-101 Audio Coupler, a potted transformer device mounted at the rear of the tuning capacitor, appears to have been introduced with the SW-3. I haven't found it listed in the earlier National catalogs at my disposal. The unit consists of a 700 Hy audio choke, a 0.01 mfd coupling capacitor, and a 250,000 ohm grid resistor. It is easy to check with simple radio bench test gear, and can be rebuilt if necessary. Details are in the restoration column in this issue.

Special Features

William Orr began his *CQ* magazine series on classic radios with an article on the SW-3 (2). Orr was a friend of Jim Millen (formerly the VP in charge of product development for the National Company). He stated that the 1930 SW-3 design, which was years ahead of its time, was marketed to commercial airlines (for which its light weight was ideal) as well as radio amateurs. Pan American Airways, believing that good c.w. equipment was more efficient than the existing radiophone apparatus, used the SW-3s on its overseas clippers—mainly the South American routes.

One of the major features of both the SW-3 and the predecessor SW-5 was dependable sin-

Setting a New Standard in HF Receiver Design

NATIONAL SW-3

This new Ham receiver follows essentially the same circuit as the new NATIONAL SW-5 THRILL-BOX but being for headset use only, omits the Push-Pull Audio.

FULL A. C. MODEL

Uses Type No. 235 and 227 tubes, and operates on full A.C. with National type 5880 Power-Pack, specially designed for humless operation with RF filter, two-section Hum filter and electrostatic shield between secondaries and line winding (eliminating "tunable" hum).

UNIVERSAL MODEL

Uses new 6 volt, five-prong heater type No. 235 and 237 tubes for battery operation; or Type No. 235 and 227 tubes can be used with 2.5 volts A.C. on the heaters and batteries for B-supply.

HIGH SIGNAL-TO-NOISE RATIO

The combined results of careful circuit design give exceedingly high signal-to-noise ratio.

COMPACT — ADAPTABLE TO PORTABLE, AIRCRAFT AND BOAT USE

Receiver is extremely compact: 9" x 9¾" x 7". Simple, attractive metal cabinet is standard equipment, and forms integral part of the shielding. It can be equipped with hooks for spring mounting on airplanes and will fit in a very small space.

BAND-SPREAD COILS STANDARD EQUIPMENT

Standard equipment are Band-Spread Coils for 20, 40, and 80-Meter Amateur Bands.

THE PRICE IS RIGHT

The price of the SW-3 puts it within the reach of every amateur. Write us for full particulars and prices using coupon below.

SPECIAL SHIELDING

Special shielding in the SW-3, the result of careful research, is one of the reasons for its remarkable efficiency.

SINGLE CONTROL

The SW-3 has true single control. Set and forget the antenna trimmer. Special HF Variables have insulated main bearings and constant-impedance pig tails and are insulated with R-39.

CALIBRATED ATTENUATION CONTROL

In the SW-3, the attenuation-control is an Audibility Meter. Designed so that angle of rotation is directly proportional to the R-Rating of signal intensity, the signal intensity may be read directly on the control. The control wheel is so mounted as to be operated with the same hand as used for tuning, leaving the other free for sensitivity control.

REAL GAIN IN RF STAGE

The design makes possible a real RF gain because of lower plate impedance of 235 tube.

SMOOTH SENSITIVITY CONTROL

Employing a hitherto unknown and unused characteristic of the 235 Variable-mu tube, the point of maximum sensitivity is approached on an inverse exponential curve. Result: — extremely stable operation at maximum sensitivity, without critical control-setting.

NATIONAL SW-3 AMATEUR HF RECEIVER

COUPON

National Co. Inc.
61 Sherman Street
Malden, Mass.
Gentlemen:
Please send me full particulars and prices on your new SW-3 Ham Receiver.

Name.....

Address.....

QST-10-1-31

Say You Saw It in QST — It Identifies You and Helps QST

Original announcement of the SW-3 receiver from the October, 1931 QST.

gle-dial control, with the rf and detector gang-tuned. The success of this system in National receivers was due to careful engineering and manufacturing, using quality parts.

The Tuned Circuits. The tuning capacitors, specially built by National, have two electrically-independent ganged sections. The rotors were isolated from the frame and each other. The coils were of moisture resistant R-39 molded formulation and wound with distinctive wire. They were grooved for the primary and secondary turns and had slot windings for the ticklers.

The bandspread coils had tapped secondaries, with a trimmer capacitor and grid leak located inside the detector coil. When these coils are used, the grid clips are removed from the caps of the r.f. and detector tubes and placed on fiber blanks provided in the cabinet. Grid leads from the coils are clipped on instead. These were very stable coils that functioned well under adverse humidity conditions, and the combination of quality components gave the tank circuits an inherent stability that was remarkable for the day.

Ten coil sets covered the useful range of 9 to 2000 meters, with bandspread coils available for the five major amateur bands then in use. Model I used the 10-20 series; II the 60-70 series; and III used the 30-40 series coils. The only apparent difference is the number of tickler turns in the slot winding.

The bandspread coils have the suffix "A" after the number. Early coils were not numbered, but color coded, with either a dot on the bottom, or a color-filled slot on the top edge. Coils from one series may be usable in another, but obtaining proper regeneration (it should occur about mid-range on the control) could be a problem.

Some signals can still be picked up even without proper regeneration, allowing you to check the frequency range of unmarked coils. If you have access to the coil specifications, you can rewind the tickler of a mismatched coil. Often a single turn, or a fraction of a turn, will make the difference.

As of this writing, coil specifications, as well as forms for winding new SW-3 coils can be obtained from James Fred (5355 S 275 West, Cutler, IN 46920, phone 765-268-2214). These excellent quality forms do not have the primary and secondary winding grooves of the original National parts, though they do have the tickler slot. Wind your coils carefully and they will work fine. You may also find some defunct original National forms that can be rewound. If you take this job on, a good source of quality wire is an electric motor repair shop.

Other Issues. Proper interstage shielding is critical for a sensitive, controllable regenerative receiver. Any interaction between the RF and detector stages must be minimized. Not only does the SW-3 have a standard shield for the r.f. tube, but the RF and detector stages are isolated by distinctive metal shields welded to the cabinet. Details of the development of this and other features are in Millen's landmark *QST* article, which was often included in SW-3 instruction manuals.

The thumbwheel gain control is calibrated in R units (the signal-strength units of the day). I've seen various National SW-3 schematics placing this control across the antenna coil, in the cathode of the RF stage, in the RF grid return, or in the grid of the audio stage. The Model II described in my restoration column in this issue has the control in the audio stage, with the RF tube operating wide open. That approach appears less than satisfactory, and when time permits, some tinkering is indicated. This may in part explain a comment by Paul Bohlander, W3VVS, who has restored twelve SW-3s and found that while they all look alike, "they are all different."

Nowdays there is a romantic aura surrounding the SW-3, which after all was just one product among many offered by just one company in the growing electronics industry of the 1930s. Its popularity has to be traced to a combination of adroit marketing and careful engineering, coupled with over a decade of experience and National's reputation for quality products in this new field. For years the SW-3 was used by hams, government agencies, commercial stations, airlines, ships, expeditions, and anywhere else that a versatile, simple, light-weight dependable receiver could apply.

The radio worked, and it worked well. Its success certainly must have done a lot for National's reputation and cash register.

Additional Comments

I asked Jim Hanlon, who has contributed to this column in the past and written extensively for *Electric Radio* magazine, to review this article. His own article on the SW-3 has been previously cited (4). His paraphrased comments follow.

1. Your date of 1936 for the introduction of the Model II agrees with Orr's article. However, the fellow who sold me my Model II told me it was built in 1933 or 1934. He should have known, since he was a member of the radio club that originally purchased it and later bought it from the club.

2. Regarding a source of coil wire, I would

(continued on page 32)

NEW BOOKS AND LITERATURE

DAVID W. KRAEUTER, 506 E. WHEELING ST., WASHINGTON, PA 15301 E-MAIL KRAEUTER@SGI.NET
PLEASE INCLUDE SASE FOR REPLY.

Books to be reviewed in this column should be sent directly to David Kraeuter at the address above. After review, all such books become a permanent part of The AWA Library, which is part of The AWA Electronic Communication Museum and is available to members for browsing and research.

Charles Herrold, Inventor of Radio Broadcasting

By Gordon Greb and Mike Adams. Published 2003 by McFarland & Company, Inc. 800-253-2187, www.mcfarlandpub.com, 7x10 inches, 247 pages, softcover, $45.00.

Mike Adams' companion film *Broadcasting's Forgotten Father* appeared in 1994. Now he has teamed with broadcast educator Gordon Greb to produce what should long remain the definitive work on Herrold.

The book actually has two subjects. It is a thorough and detailed biography and it is an extended discussion of the endless—and endlessly interesting—question of who was first.

Born in 1875, Herrold used a Rhumkorff coil and Branley tube in 1895 to broadcast a telegraph signal for a mile after reading a news item describing Marconi's experiments. By 1909 Herrold was broadcasting on a regular basis using a patented arc transmitter of his own design. He notarized a description of his broadcasting work and publicized it in a radio catalog in 1910. He spent much of his later years attempting to gain recognition for his early work. But lacking the charisma and self-promoting ability of another broadcasting pioneer, Lee de Forest, Herrold slipped out of the public eye and died unknown in 1948.

Simultaneous or independent invention or discovery is nothing new. Newton and Leibniz invented calculus independently of each other in the 17th century (and argued over who was first for much of the rest of their lives). So too in the early 20th century several men invented radio broadcasting in ignorance of each other's work. Everyone's familiar with KDKA's pioneering work in 1920, but few know of Charles Herrold's much earlier daily broadcasting in San Jose, California in 1912 and later. So were KDKA and Frank Conrad the KCBS (descended from Herrold's station) and Charles Herrold of Pittsburgh or was it the other way around?

In what probably won't be the final analysis of the subject, the authors allow that KDKA is the oldest broadcasting station but that KCBS was the first. Their case for Herrold's primacy in broadcasting is cogently presented and difficult to refute.

♦ ♦ ♦ ♦

The All-American Five Radio: Understanding and Restoring Transformerless Radios of the 1940s, 50s and 60s

By Richard McWhorter. Published 2003 by Sonoran Publishing, LLC, 480-961-5176, www.greengatebooks.com, 7 x 10 inches, 92 pages, softcover, $21.95.

What a neat idea for a book! McWhorter attempts to introduce the neophyte to radio receiver operation and repair by using a particular class of radios, in this case the ubiquitous All-American Five, exemplified here by the Zenith model 9×56½. "DON'T PLUG IT IN" are, appropriately, his first words in chapter one. Good advice for the enthusiastic antique radio newbie.

McWhorter then gives the reader lightning-fast lessons in DC, AC, resistance, Ohm's law, and capacitance before taking him methodically through the radio itself, beginning with the power supply, then moving backwards from the audio amplifier to the antenna. Schematic symbols are clearly shown and explained and the reader is often invited to compare the schematic with the corresponding equally clear pictorial drawings of each radio section.

It all works, but the book probably should have been longer or not tried to do so much. There just isn't enough room in the 45-or-so pages devoted to explanation of the radio stages, especially when one is writing to someone who may have come to the book with little or no knowledge of electronics.

The glossary should have been edited more rigorously or else omitted. It uses undefined technical terms such as *impedance, electromotive* and *coulomb* to define other terms. *Duplex-diode* is defined, but *diode* is not. *Kiloampere* is defined (needlessly) but *kilohm* and *megohm* are not defined. Some definitions simply make no sense, as "signal grid, the grid placed between the screen grid in a pentagrid vacuum tube", or "intermediate frequency...A frequency to which

a signal wave is shifted location has an intermediate step in transmission or reception". This makes pretty rough going for the average inexperienced reader.

Altogether this book is a good attempt at explaining many complex concepts in very few words. Much can be learned from it and it will serve its purpose if it leaves the reader wanting more, but it must not be taken for a basic or introductory text.

♦ ♦ ♦ ♦

The History & Evolution of the Microphone

By Bob Paquette. Edited by Nathan St. Pierre. Published 1999. 414-645-1672. See related webpage http://w1tp.com/mpermic.htm, *8¼ x 10¾ inches, 842 pages, softcover, price?*

Weighing in at six pounds, this gargantuan book has many of the earmarks of a self-published labor of love: each copy is hand numbered, the pages are oversize and there are many of them, there is uneven print quality ranging from very poor to very good, much of the text is reproduced directly from other sources, and the book was assembled over a period of very many years. Anyone with an interest in—or obsession with—microphones will want to spend time with this book.

The majority of the book consists of reproductions (some of which are unattributed or incomplete) of such diverse document types as bulletins, catalogs, internal memos, manufacturer codes and specs, instruction and technical data sheets, drawings, newspaper and periodical articles, book chapters, advertisements, monochrome and color photos (some of these are downright beautiful), patent specifications, museum and corporate publications, government documents, proceedings, personal correspondence, etc.

The wide diversity of sources here makes the book cry out for a comprehensive index listing including, at minimum, all makes and models and all personal names. Had that been included, the book could have become a standard in the field; as it stands the huge amount of information here will nevertheless attract researchers who will use it as a sourcebook or starting place for information not easily found elsewhere. For the microphone, there is nothing else like this book available.

ALSO NOTED

Gavin Weightman, *Signor Marconi's Magic Box: The Most Remarkable Invention of the 19th Century and the Amateur Inventor Whose Genius Sparked a Revolution*, Da Capo, 2003, 312 pages.

COMMUNICATIONS RECEIVER, *continued from page 30*

add that Antique Electronic Supply www.tubesandmore.com lists magnet wire in at least 8 gauges. They sell full spools for reasonable prices, $5.50 for a 100-foot spool of #21 or #22, up to $4.95 for a 750-foot spool of #42. They also sell Celanese-covered wire, including Litz wire, by the foot.

3. You might want to tip off your readers about the information regarding winding a 30-meter bandspread coil pair that appeared in my 1993 article. I don't know of any other place that it has appeared.

4. Finally, I would also suggest that you assure your readers that the SW-3 is more than just an interesting antique. Several of them show up in the various AWA contests, usually paired with a 210 Hartley, TNT or TPTG. I've worked the east coast from New Mexico on 80 meters with my pair. The SW-3, while not at all selective, is sufficiently sensitive to hear atmospheric noise with its tuned RF amplifier stage. With a little coaxing and given a not too crowded band, it will do just as good a job as a modern superhet.

REFERENCES

(1) Millen, James, *QST*, September 1931.
(2) Orr, William, *CQ*, July 1971.
(3) Orr, William, *CQ*, February 1978.
(4) Hanlon, James, *Electric Radio*, August 1993.
(5) Faulstick, Roger, *Electric Radio*, Dec. 1993, January and February 1994.
(6) Riders Manual, Volume 14. (NOTE: There is gold mine of information on other National receivers in this reference.)
(7) Ruggere, R., and Troe, James, *ARCA Gazette*, Vol. 19, #4.
(8) Fizette, Wm, *The OTB*, August 1993.
(9) Fizette, Wm, *The OTB*, February 1993.

BY JAMES P. RYBAK

JOHN LOGIE BAIRD'S 1928 STEREOSCOPIC TELEVISOR

The year 1928 produced numerous important achievements in the development of television. Four of the most significant were the work of John Logie Baird. This Scottish engineer and inventor accomplished very much, very quickly, while working with only a meager budget, an almost non-existent staff, and the most modest of laboratory facilities. Despite these seemingly overwhelming limitations, Baird had given the world the first demonstration of true television in late January of 1926 when he demonstrated his "televisor" to approximately 40 members of the Royal Society and other notables [1, 2, 3].

Baird's first major accomplishment of 1928 occurred in February, when he showed that television signals could span the Atlantic Ocean from London to New York [1, 2]. In June of that same year, he publicly demonstrated that the highly sensitive photocells he had developed could produce high quality television images out of doors using only daylight for illumination. Blindingly bright, extremely hot studio lights were no longer required [3].

Only one month later, the inventor successfully demonstrated that television images could be transmitted in what was a very close approximation to "living color." It would be another year until color television was demonstrated in the United States as the result of the work of a large staff of engineers and scientists at Bell Laboratories [4, 5, 6].

Baird completed his quadruplet of major technological accomplishments on August 10, 1928 with a demonstration of stereoscopic or 3-dimensional television [7]. This was a highly noteworthy achievement, despite the fact that the transmission of television images in 3-dimensions would never later be pursued to any significant extent by any commercial or governmental broadcast organization. However, this field would always be of great interest to Baird. He continued to perfect stereoscopic television technology almost to the time of his death in 1946 [8].

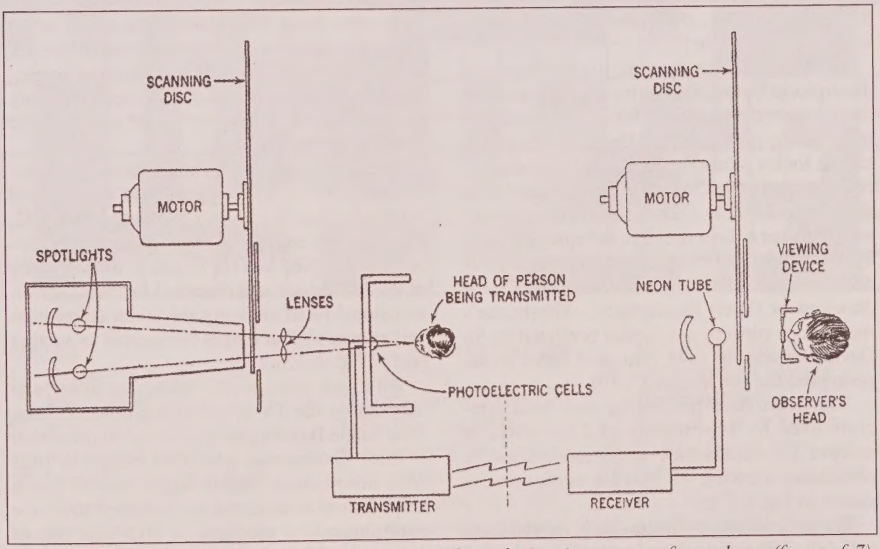


Fig. 1. Baird's stereoscopic televisor system produced two distinct images, one for each eye (from ref. 7).

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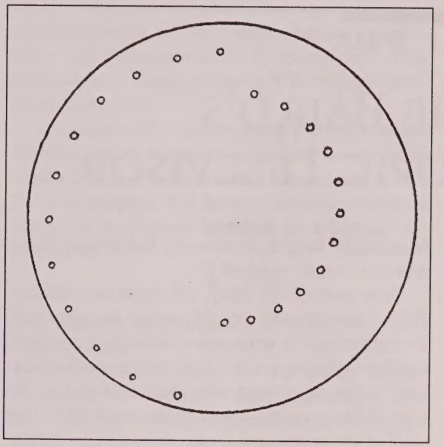


The Nipkow disk Baird used for scanning in his stereoscopic televisor system had two sets of spiral holes (from ref. 11).

The process by which the human brain produces 3-dimensional images in the mind of the viewer had been understood long before Baird's stereoscopic television work. The perception of a third, or depth, dimension in our minds is the result of the fact that we have two eyes, each of which views the same scene from a slightly different position. Our brain superimposes or combines these two different images into one and, in the process, creates the sensation of depth. If we had only one eye, three dimensional vision would be impossible [7, 9].

The creation of stereoscopic images from two-dimensional illustrations, primarily for entertainment purposes, pre-dated Baird's stereoscopic television by ninety years. Although more widely known for his pioneering work with wired telegraphy systems, Sir Charles Wheatstone invented the "stereoscope" in 1838. This device enabled a person to see a three dimensional-image created by using mirrors to superimpose a pair of slightly different views of the same two-dimensional drawings or (later) photographs. Wheatstone's stereoscope concept was further perfected by Sir David Brewster in 1844 who used lenses to superimpose the two images [9, 10].

John Logie Baird utilized the same basic principle used by Wheatstone and Brewster to achieve his stereoscopic television images. A schematic drawing of Baird's equipment is shown as Fig. 1 [7].

The necessary two images, each viewed from a slightly different position, were obtained using a rotating Nipkow scanning disk with two separate spiral patterns of holes located on opposite sides of the disk. One set of spiral holes was located about 4 inches closer to the center of the disk than the other set, corresponding to the distance between a person's eyes [7, 11]. A Nipkow disk of the type used by Baird is shown in Fig. 2 [11].

Each set of holes had its own high intensity lamp and focusing lens for scanning the image to be transmitted. The result was that, in one rotation of the disk, the image was scanned twice, once from each of the two viewing positions. One position corresponded to viewing the image with the left eye and the other to viewing the image with the right eye. It should be noted that the scan from one viewing position was completed before the scan from the other viewing position was begun. The result was the creation of both a "left" and a "right" image [7, 11].

The scanning light reflected by the object being televised struck photocells strategically positioned around the object. The resistance of the photocells and, hence, the magnitude of the current flowing through them varied with the intensity of the light striking the cells at a given instant. This current was then used to modulate a transmitter [7, 11].

The equipment at the receiving location was similar to that at the transmitter. A Nipkow disk with an identical pattern of spiral holes rotated in synchronization with the transmitter disk. A single neon lamp was located behind the receiving disk, as in ordinary, non-stereoscopic television. This neon lamp illuminated each spiral set of holes sequentially and thereby created the appropriate pair of images on a viewing screen. The "left" image was displaced approximately one-half inch to left of the "right" image on the viewing screen [7].

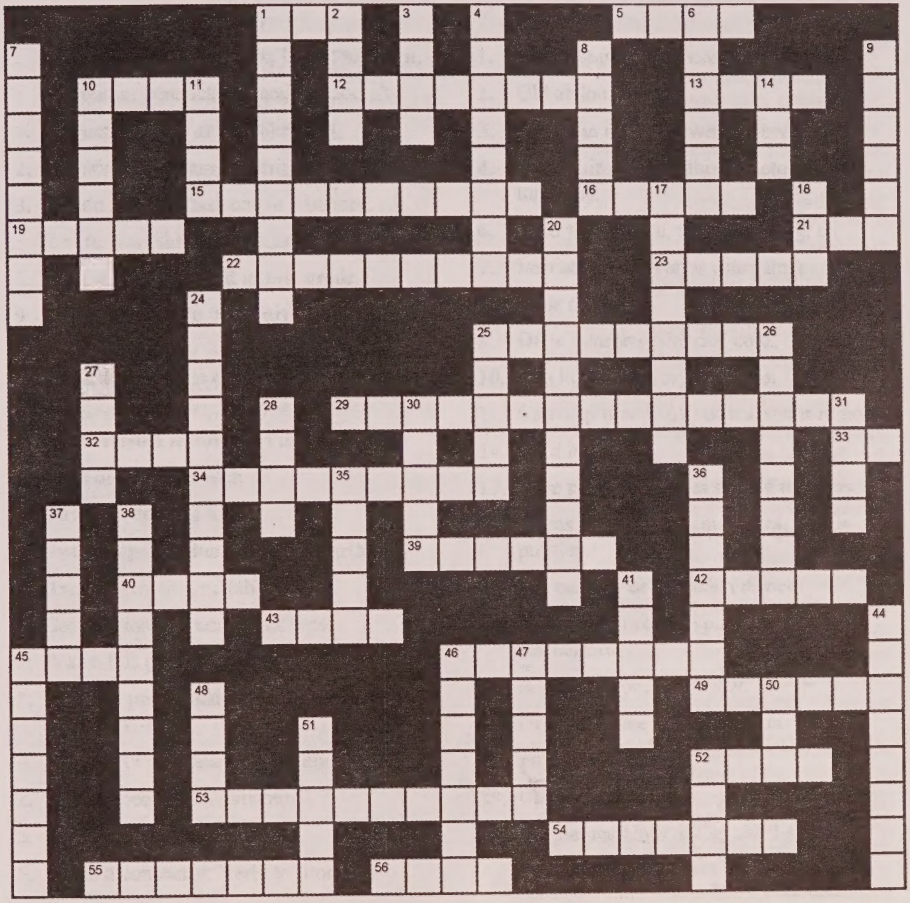
The two images were viewed through a stereoscope type of viewing device which used prisms to cause the images to merge into one [7, 11]. A highly credible witness to Baird's demonstration reported that the image of a man sitting at the transmitter was observed in "perfect 3-dimensional relief showing the facial delineation and expression" at a receiver located in another part of the building [7].

Although stereoscopic television never was adopted by the TV broadcasting organizations, John Logie Baird's generation and transmission of three-dimensional television images in 1928 was, nonetheless, highly significant in that it helped demonstrate the potential of this new communication medium. It also was one of many examples of the technologically creative capabilities of Baird's brilliant mind.

(continued on page 36)

BY DAVID W. KRAEUTER

FROM THE JUNK BOX, OR PARTS IS PARTS



ACROSS

1. If yours is in the junk box, I want to buy it.
5. Sometimes conducts, sometimes doesn't.
10. Frequency range or belt-like strip.
12. Sometimes it's found in strips.
13. Should be more than one in a battery.
15. It mitigates vibration effects (run together).
16. Not the kind you used in first grade.
19. When stressed out, this part makes electricity.
21. Cholesterol source or antenna insulator type.
22. Feline hirsute feature (run together).
23. Type of race or switch.
25. To new timers it's a cap.
29. Switch type and function (run together).
32. Another switch type (abbrev.)

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33. Conjunction or transformer type.
34. Watch this part. Hertz did.
39. We don't pronounce the "L" in the US but the British do.
40. Antenna or shoelace configuration.
42. Electro-mechanical indicator.
43. Why do we keep them?
45. Noun: a connector. Verb: to promote.
46. Dynamo subassembly.
49. Rectifier trade name.
52. Braided wire type.
53. Transfer resistor.
54. It's right between the hams.
55. Detector type or actor/comedian.
56. Generic conductor.

DOWN

1. Underwear or insulator type.
2. Old abdomens.
3. Comes in dial or power variety.
4. Langmuir patented this detector (run together).
6. Used with an eye, tube, hip, plug, etc.
7. Insulation remover or entertainer.
8. Type of holder.
9. Often consorts with dial cord.
10. Can help tune a crystal radio.
11. Can help tune a tube or transistor radio.
14. Lead holder.
17. Wire type; sometimes said of travelers.
18. Opens doors, makes messages, solves puzzles.
20. Die cast toy or induction device.
24. This hard-to-replace part works aesthetically.
25. A wirefest, one might say.
26. Often in series with a filament.
27. Paper or dinner type.
28. Clamp part.
30. Simple machines of the wheel-and-axle type.
31. From Loomis' or Marconi's junk box.
35. Wire type; sometimes said of an achievement.
36. Doughnut-shaped insulator.
37. Usually has a grooved rim.
38. It'd take more than one clip to catch one.
41. Measures rain or wire.
44. Antenna wire separator.
45. Common frequency or volume indicator.
46. Used when you don't have the right one.
47. Sometimes needs brushes, sometimes doesn't.
48. Always at the bottom.
50. Enthusiast, bird food or part.
51. Group of experts, dust shield or parts holder.
52. Heavy metal or parts connector.

See Answer Key on Page 50

JOHN LOGIE BAIRD, *continued from page 34*

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MICS AND MEN

EDITED BY **GEORGE A. FREEMAN** WITH **JANET DELL FREEMAN**, 102 E. MAIN ST., MADISON, IN 47250-3411. PHONE (812) 265-6878. E-MAIL RALOGEUM@AOL.COM.
PLEASE INCLUDE SASE FOR REPLY.

The Mic: The Westinghouse Double Button "Tomato Can"
The Man: William Jennings Bryan

Bob Paquette reports that his Westinghouse double button "tomato can" carbon microphone weighs perhaps a half-pound, while a similar Western Electric model weighs some 2½ pounds. Back in 1922, Westinghouse stations KDKA, (East Pittsburgh, PA), WJZ (Newark, NJ), WBZ (Springfield, MA) and KYW (Chicago, IL) could hang their "tomato can" mics from delicate bird cage stands (1).

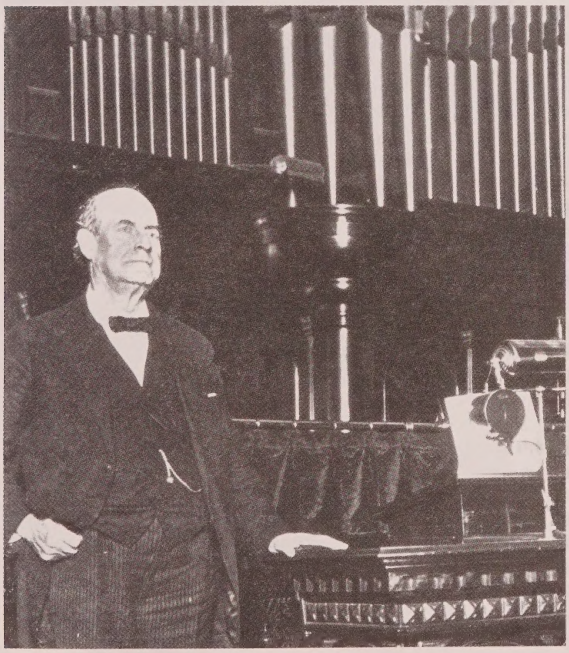
Bob points out that Westinghouse microphones were crude and less sophisticated than the W.E. or RCA units. The heavyweight in the Westinghouse system was the associated amplifier. It amplified voltage two million times and current about ten billion times (2).

This Westinghouse "tomato can" microphone, seen hanging from the reading light, appears at the Point Breeze Presbyterian Church in Pittsburgh, PA on March 12, 1922. The man is William Jennings Bryan, who was a major force in American politics for 30 years. Perhaps this is a signature photograph because it associates him with religious ideals.

Bryan's famous "cross of gold" speech won him the 1892 Democratic presidential nomination. He won more votes than Grover Cleveland, but the electoral college made Cleveland president. Bryan later served as Secretary of State under Woodrow Wilson.

He conducted the prosecution against the teaching of evolution in the legendary Scopes Trial. Though he won the case, which concluded in the summer of 1925, he died five days later partly—it was thought—because of the considerable stress inflicted on him by the vigorous defense of attorney Clarence Darrow.

I'm delighted to inform you that the theme of the 2004 AWA Conference will be "BROADCASTING." And beginning next year, the old equipment contest will include a category for microphones. If you have questions about contest rules and how judges evaluate entries feel free to contact me. I hope you'll join in the competition and the fun.



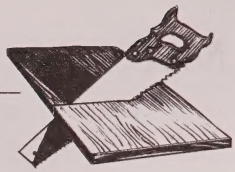
William Jennings Bryan is apparently posing, not speaking, because the Westinghouse "tomato can" suspended from the reading light is several feet away from him. The location: Pittsburgh's Point Breeze Presbyterian Church.

REFERENCES

(1) Paquette, B. *The History And Evolution of The Microphone*, self published, Milwaukee, WI, 1999. pg. 750.
(2) Ibid. pg. 395.

BREADBOARDING

EDITED BY **DICK PARKS**, 2620 LAKE RIDGE CT., OAKTON, VA 22124
E-MAIL: DPARKS@EROLS.COM. *PLEASE INCLUDE SASE FOR REPLY.*



Bring Historical Circuits to Life On Your Workbench!

How Fancy Do Breadboards Get?

A pal of mine brought me a pair of neat-looking wooden items that he'd picked up at a radio meet. After I'd studied them for a while, I told him they were probably audio amplifiers, and might have been intended for laboratory use in an early radio plant. See if you agree.

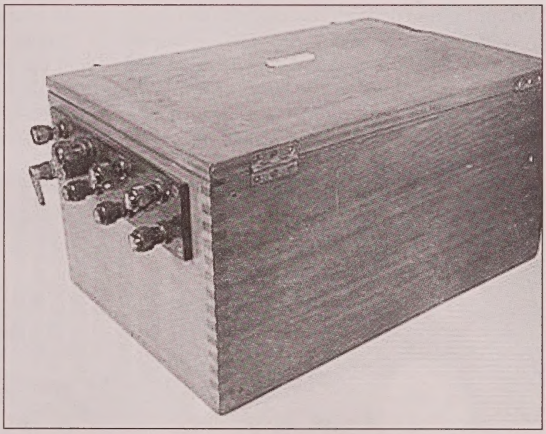
Nice dovetailed boxes—they measure 7×13×6 and 8×15×10 inches, respectively. Each has a hinged lid and bakelite panels mounting high-grade British binding posts. Each post has an engraved identification as to its use. The celluloid labels on the cases read "CLIFTON INSTRUMENTS LTD. CLIFTON GROVE, BRISTOL, ENG. MAKERS." One of the units has six Mullard balloon tubes in the amplifier; the other has two.

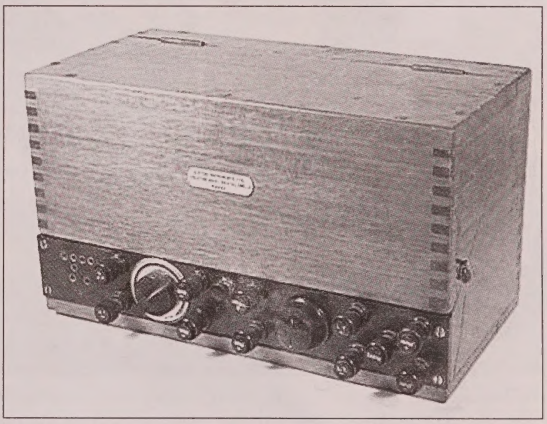
Looking at the interior of the six-tube unit, the four tubes on the left are type PM24 filamentary tetrodes; the other two are type 354 V triodes with indirectly heated cathodes. Wiring is point-to-point by right-angle busbar leads. The square boxes are paper capacitors in 4 μF and 8 μF sizes.

Inside the larger, two-tube, unit are two more of the 354V tubes in a subchassis, also wooden. It's contained in a surround made of horsehair inside a tin all-around shield. A phone plug and two jacks allow the user to select one- or two-tube operation. Two of its binding posts are labeled "Input." The hot post has a grounded brass fitting around it, and that's what led me to conclude that I was looking at a low-level signal preamplifier. The other unit would be the output amplifier.

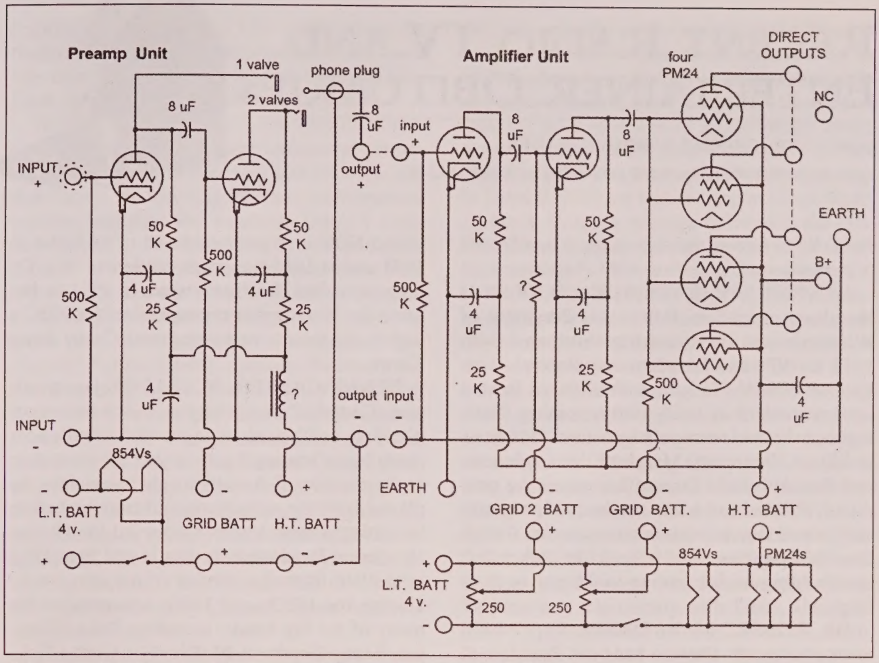
After I had traced out the circuit as best I could without taking the boxes apart, I found that the four output tubes could be used one, two, three, or all four at a time by accessing various of the seven small female receptacles at the left of the bakelite panel the output amplifier.

There are no input or output transformers; the stages we see here are all R-C coupled. Just as a guess, the gain of the boxes with all four triodes working might be 8×8×8×8×3, or on the order of 12000. Make that (20 log 12000) = 84 dB in scientific talk.



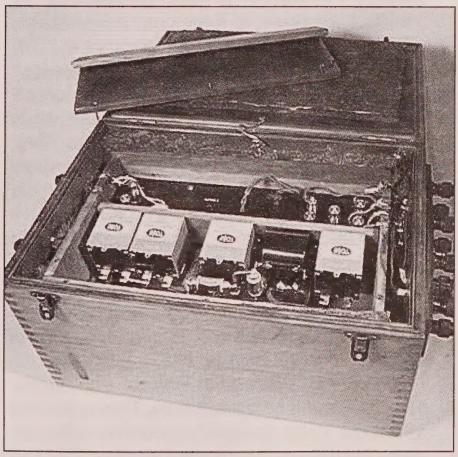


The Clifton Instruments Laboratory units were identified as a laboratory preamplifier (top) and output amplifier.



Here are the circuits of the preamplifier and output amplifier as accurately as I have been able to trace them so far.

The tubes are mounted in spring sockets, the horsehair cushions the preamp tubes, and there are remnants of sponge material around the output tubes. I figure that microphonics were a problem for the engineers in high gain use.



The circuitry of the preamplifier is cushioned by horsehair and surrounded by a tin shield.

So—is this assemblage a breadboard? It's clearly not a production unit, what with all the binding posts and unlabeled gain pots. But the construction is breadboard style, though the layout obviously took a lot of thought. No nameplate indicating its use, no hints as to battery voltages other than labels on the tubes giving nominal and maximum electrode voltages.

The Internet gave me no information about Clifton Instruments of Bristol, England. I can't fire this up unless I replace a missing resistor, and one of the pots is intermittent. But it ought to come alive if those things are fixed.

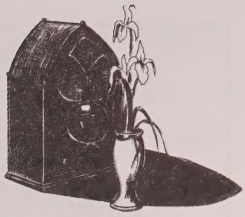
I think it's a one-off lab amplifier, for amplifying low-level audio signals and probably for use in an early British radio lab. Anyone out there want to weigh in with more info on this nice breadboard pair? I'm including what I think is the schematic of this set of early amplifiers.

Announcements

Invitations are open for those of you who would like to suggest topics for this column. I have a huge junk box (it's really a roomful)

(continued on page 43)

RECENT RADIO, TV AND ENTERTAINER OBITUARIES



COMPILED BY **CHARLES S. GRIFFEN W1GYR**
1225 NEW BRITAIN AVE., WEST HARTFORD, CT 06110-2405

Note: When known, the date of death is indicated in parenthesis.

WINTHROP P. BAKER, JR., 71, (6-7-03) broadcast executive. Baker was President of Westinghouse Broadcasting Company from 1973 to 1979 and President and General Manager of WNEV (TV), now WHDH, in Boston until retirement in 1984. Before joining Westinghouse he held managerial positions at stations in Illinois, Louisiana, Maryland, Massachusetts and Pennsylvania. During his career he produced, directed and wrote hundreds of programs and helped develop the news magazine format for *PM Magazine* in 1976. After Baker left broadcasting he became an innkeeper in New England.

DR. ROBERT M. BATSCHA, 58, (7-4-03) museum director. Batscha had been President of The Museum of Television & Radio (formerly the Museum of Broadcasting) in New York City since 1981. During his tenure the collection of radio and television programs grew from about 5,000 to 120,000 and was moved to larger quarters. In 1996 Batscha opened a second museum with similar resources in Beverly Hills. He also founded the MT&R Media Center and the MT&R International Council which provided forums for industry leaders, performers and academics to discuss communications topics.

DAVID BRINKLEY, 82, (6-11-03) broadcast journalist. Brinkley, a pioneer in the development of broadcast journalism, was one of the first radio newscasters to make the transition to television during the 1940s. He was at the height of his popularity when he and Chet Huntley anchored the nightly news program, *The Huntley-Brinkley Report* (NBC 1956-1970). When Huntley retired in 1970, the program was renamed *The NBC Nightly News* anchored by Brinkley and two others on a rotating basis. In 1971 John Chancellor was named anchor and Brinkley was paired with him from 1976-1979. He hosted *David Brinkley's Journal* (NBC 1961-1963), winning Emmy Awards in 1962 and 1963 as the best public affairs program on television, and a Sunday morning show called *This Week With David Brinkley* (ABC 1981-1997). Brinkley joined NBC in Washington as a news writer in 1943 and in 1945 was made moderator of a TV program called *America United*. In 1951 he became the Washington correspondent for NBC's nightly 15-minute news program, *Camel News Caravan*.

BENNY CARTER, 95, (7-12-03) jazz musician. Carter's "...versatility as a first-rate saxophonist, composer-arranger and bandleader made him a leading figure in jazz for more than eight decades." A self-taught musician, he played both the saxophone and trumpet before becoming a band leader. Carter led the Horace Henderson Band when he was 21 and from 1933 until 1946 fronted a number of his own bands. During the 1930s and 1940s he arranged for many of the big bands, including Duke Ellington, Benny Goodman, McKinney's Cotton Pickers, Charlie Barnet, Glenn Miller, Artie Shaw and Count Basie. In 1946 Carter disbanded his last band to concentrate on film and television work. He played on over 100 movie soundtracks and orchestrated and arranged music for many films and dozens of television shows. Some of Carter's compositions include *When Lights Are Low, Blues in My Heart* and *Malibu*. In 1987 he received a lifetime achievement award from the National Academy of Recording Arts and Sciences. Carter gave his final performance in 1998.

JUNE CARTER CASH, 73, (5-15-03) singer and songwriter. Cash, a descendent of a pioneering country music family, toured and made recordings with her husband Johnny Cash. Their recordings of *Jackson* and *If I Were a Carpenter* won Grammy Awards in 1967 and 1970 respectively. Cash wrote *Ring of Fire* (1961), which many consider one of her best compositions. In 1963 it became a number one country hit for Johnny Cash. June's mother, Maybelle, was a member of the Carter Family music act which made some of the first country music recordings for Victor beginning in 1927. When the act broke up, she continued to perform with Mother Maybelle and the Carter Sisters. During the late 1930s and 1940s the sisters starred on radio programs aired on XERA in Del Rio, TX and WNOX in Knoxville, TN. Later they became

regulars at the Grand Ole Opry show in Nashville. Cash's TV credits include *The Grand Ole Opry* (ABC 1955-1956) and *The Johnny Cash Show* (ABC 1969-1971, CBS 1976).

HUME CRONYN, 91, (6-15-03) actor. Cronyn was a versatile stage and screen character actor who often performed with his wife, Jessica Tandy. A sampling of their performances together includes: the broadway plays *A Delicate Balance, The Gin Game* (1978) and *Noel Coward in Two Keys*; the television show *Foxfire* (1987); and the films *Cocoon (1985)* and *Cocoon: The Return (1988)*. Cronyn acted in more than 40 feature films, including *The Ziegfeld Follies* (1946), opposite Fanny Brice; *The Beginning of the End* (1947); *People Will Talk* (1951), with Gary Grant and *Sunrise at Campobello*. He was nominated for an Oscar Award for his role in *The Seventh Cross* (1944) with Spencer Tracy. Cronyn made his stage and film debuts in *Hipper's Holiday* (1934) and Alfred Hitchcock's *Shadow of a Doubt* (1943), respectively. The couple received many awards including election to the Theater Hall of Fame in 1979 and the Kennedy Center Lifetime Achievement medal in 1986.

CELIA CRUZ, 77, (7-16-03) singer. Cruz, known as the "Queen of Salsa," sang with every major Latin bandleader beginning in the 1940s and recorded more than 70 albums. She won a Grammy Award last year for the best salsa album, *La Negra Tience Tumbao*. Some of Cruz' other recording hits include *Yerberito Moreno and Que le Den Candela*. In the 1950s she joined the Afro-Cuban group *La Sonora Matancera* and performed with them at Havana's Tropicana nightclub and on radio and television shows. During the 1960s Cruz sang with Tito Puente's Orchestra and later with bandleaders like Johnny Pacheco, Willie Colon and Ray Barretto. She continued to perform at jazz festivals, arena concerts and Latin clubs until last year. In 1994, Cruz received the National Medal of Arts from President Clinton.

BUDDY EBSEN, 95, (7-6-03) actor. Ebsen's television role as Jed Clampett on *The Beverly Hillbillies* (CBS 1962-1971) brought him the greatest fame. Some of his other TV credits include the *Davy Crockett* series on Disneyland (ABC 1954), *Northwest Passage* (NBC 1958-1959), *Barnaby Jones* (CBS 1973 -1980) and *Matt Houston* (ABC 1982 -1985). Ebsen began his career on Broadway in 1928 as a dancer in Ziegfelds's *Whoopie*, starring Eddie Canter. In 1930 he and his sister formed the dance team *Vilma and Buddy Ebsen* and performed in vaudeville. This led to appearances in the Broadway musicals *Flying Colors* (1932) and *Ziegfeld Follies of 1934*. After their appearance in MGM's *Broadway Melody of 1938*, Vilma married and returned to New York City. Ebsen, as a "single," next appeared in *Banjo on My Knee, Born to Dance* and *Captain January*. He left MGM in 1939 and returned to Broadway to star in *Yokel Boy*. Ebsen was starring in *Good Night, Ladies* in Chicago when he enlisted in the U.S. Coast Guard. After the war he starred in Oscar Hammerstein's 1946 revival of *Show Boat*.

KATHARINE HEPBURN, 96, (6-29-03) actress. Hepburn's sophisticated appearance, self confidence and independence made her one of the most famous movie actresses of all time. During her career she played varied roles in 43 films and dozens of stage and television appearances. Hepburn won Oscar Awards for her performances in *Morning Glory* (1933), *Guess Who's Coming to Dinner* (1967), *The Lion in Winter* (1968) and *On Golden Pond* (1981). Her final screen appearance was in *Love Affair* (1994). In 1942 she and Spencer Tracy appeared in their first film together, *Woman of the Year*. This began a relationship with Tracy, a married man, which remained an open secret for nearly thirty years. Hepburn made her Broadway debut in *Those Days* in 1928. In 1939 she appeared in the hit play *The Philadelphia Story*, which was written for her, and later was made into a movie. Some of Hepburn's television movie credits include *Love Among the Ruins* (1975), *Mrs. Delafield Wants to Marry* (1986) and *One Christmas* (1994). She received Emmy Awards in 1975 for her performance in *Love Among the Ruins* (ABC Theatre) and again in 1986 for *The Spencer Tracy Legacy: A Tribute by Katharine Hepburn* (PBS).

DAME WENDY HILLER, 90, (5-14-03) actress. Hillyer was one of England's distinguished stage and screen actresses and George Bernard Shaw's chosen leading lady. Shaw selected her to star in his stage productions of *Pygmalion* and *St. Joan* in 1936 and the film adaptations of *Pygmalion* (1938) and *Major Barbara* (1941). Some of her other film credits: *I Know Where I'm Going* (1945), *Something of Value* (1957), *Separate Tables* (1958), *A Man for All Seasons* (1966), *Murder on the Orient Express* (1974), *Voyage of the Damned* (1976), *The Cat and the Canary* (1979), *The Elephant Man* (1980) and The *Lonely Passion of Judith Hearne* (1987). In 1958 Hiller received an Academy Award for her role in *Separate Tables*. On Broadway she appeared in *The Heiress* (1947), *A Moon for the Misbegotten* (1957), *Flowering Cherry* (1959) and *The Aspern Papers* (1962). She began her

career with the Manchester Repertory Theater when she was 18 and won the lead role in *Love on the Dole* four years later. Queen Elizabeth II named her a Dame of the British Empire in 1975.

BOB HOPE, 100, (7-27-03) comedian. Hope's "mastery of the comic monologue and the topical wisecrack carried him from vaudeville to Broadway musicals and then on to worldwide fame as a radio, film and television star of the first magnitude." During the 1920s Hope appeared with George Byrne on the vaudeville circuit but by 1930 he had broken up the partnership and was performing as "a single." His appearances at the Palace Theater in New York City led to parts in Broadway shows: *Ballyhoo of 1932* followed by Jerome Kern's *Roberta* (1933), *Ziegfeld's Follies* (1936) and Cole Porter's *Red, Hot and Blue* (1936). In 1932, during an engagement at the Capitol Theater, he did his first radio broadcasts for Major Bowles on *The Capitol Family Hour*. Hope appeared on a number of other radio programs before moving to Hollywood in 1937 to continue his radio work and to seek a movie role. Paramount signed him to a part in *The Big Broadcast of 1938* in which he sang a duet, *Thanks for the Memory*, with Shirley Ross. The song later became Hope's signature piece. In the fall of 1938 he signed a contract with NBC to host his own half-hour comedy series, *The Pepsodent Show Starring Bob Hope*, which continued until 1955. This was the start of a contractual relationship with the network that lasted for 61 years. Although Hope appeared in more than 60 films, he is probably best remembered for the "road" pictures with Bing Crosby and Dorothy Lamour. There were seven in all starting with *Road to Singapore* (1940) and concluding with *Road to Hong Kong* (1962). Hope's last film was *Spies Like Us* (1985). Starting with WWII, and continuing through the Gulf War, Hope logged millions of miles entertaining troops stationed at stateside and overseas bases. He made his television debut on *The Ed Sullivan Show* and in 1952 signed a TV contract with NBC and for the next four decades starred in dozens of regular and special shows including the Christmas programs. Hope was the most honored entertainer— receiving some 1,500 awards, including four honorary Oscars, the National Medal of Arts, and the Medal of Liberty.

MICHAEL "PEANUTS" HUCKO, 85, (6-19-03) jazz clarinetist. Hucko played with some of America's greatest musicians, including Louis Armstrong, Eddie Condon, Benny Goodman, Al Hirt, Glenn Miller, Ray McKinley and Jack Teagarden. Some of his credits include performing with *The ABC Studio Orchestra* (1951-1955), touring England with *The Jack Teagarden-Earl Hines All Stars* (1957) and *Louis Armstrong's All Stars* (1958-1961). During WWII Hucko was a member of *The Glenn Miller Army Air Force Band* in Europe and later, in 1974, led the Miller Band. On TV he made regular appearances on *The Lawrence Welk Show* (1970-1972). He began his career in New York City in 1939 playing tenor sax for *The Will Bradley Band*.

DAVID O. IVES, 84, (5-16-03) public broadcasting executive. Ives served as President and Chief Executive of the WGBH Educational Foundation from 1970 to 1984. The Foundation is licensee for Boston radio station WGBH (FM), Boston television stations, WGBH (Ch. 2) and WGBX (Ch. 44) and a Springfield television station, WGBY (Ch. 57). He remained Vice Chairman of the Board of Trustees and Chairman of its Executive Committee until 2001. Some of the programs started during his Presidency include *Evening at Pops, Frontline, Masterpiece Theatre, Nova, This Old House* and *The Victory Garden*. Ives also served as Vice Chairman of the Board of Managers of the Public Broadcasting Service from 1974 to 1977 and as Chairman of the National Association of Public Television Stations from 1982 to 1986. He believed in quality TV programming and often appeared on-air to raise funds to support it.

DAVID McLAUCHLIN, 56, (5-25-03) broadcast journalist. McLauchlin had been a national reporter for CBC Radio in Montreal since 1995. During his 30 year career he was one of the most recognized and honored journalists in the history of the radio group. McLauchlin was the first civilian to win the International Firefighters Award for his reporting on the high incidence of cancer among firefighters exposed to burning plastic. He cared about people and would risk his life to report on situations affecting their lives. Earlier this year he led a team of journalists to the Democratic Republic of the Congo to investigate the mining of coltan, used in the manufacture of integrated circuits in cellular phones. The documentary, *Cursed by Riches*, exposed the horrible plight of the miners. McLauchlin began his career with CBC Radio as a writer-broadcaster for *Information Morning* in Saint John, New Brunswick. Later he was field producer for *Sunday Morning in Winnipeg* and national reporter for *Radio News for the Prairies*.

GREGORY PECK, 87, (6-12-03) actor. Peck appeared in 55 films in a variety of roles some of which challenged the social inequalities of the day. His "craggy good looks, lanky grace and measured speech contributed to his screen image

as the decent, courageous man of action." In 1944, while appearing in *Morning Star* on broadway, Peck was offered his first film role (in *Days of Glory*), and during the next five years received four Academy Award nominations as best actor for performances in *Keys of the Kingdom* (1944), *The Yearling* (1946), *Gentleman's Agreement* (1947) and *Twelve O'clock High* (1949). He also starred in such film classics as *Spellbound* (1945), *Roman Holiday* (1953) and *To Kill a Mockingbird* (1962). Peck's role as Atticus Finch in "Mockingbird" earned him an Oscar Award in 1962. During the 1940s and 1950s he was a regular cast member on such radio programs as *The Prudential Family Hour of Stars* (CBS), *Hallmark Playhouse* (CBS) and *The Sealtest Variety Theater* (CBS). In 1993 Peck acted in the TV movie, *The Portrait*, with Lauren Bacall and in 1998 appeared in a TV miniseries version of *Moby Dick*. He served as the President of the Academy of Motion Picture Arts and Sciences and in 1967 received their Jean Hersholt Humanitarian Award.

DR. RICHARD PETRITZ, 80, (4-28-03) semiconductor pioneer. Petritz began his commercial career working with Jack Kilby at Texas Instruments (TI), who is credited with co-inventing the integrated circuit. Later Petritz managed TI's semiconductor R & D laboratories. In 1969 he founded Mostek Corp. in Colorado Springs, CO, which became a major DRAM manufacturer and was later acquired by United Technologies Corp. In 1977 Petritz helped found Inmos, Ltd., a British microprocessor and memory producer. He persuaded the British government to invest $50 million in the state-owned firm, which had plants in Bristol, England and Colorado Springs. Inmos was sold to Thorn EMI Ltd. in 1984 which, in turn, sold it to SGS-Thomson in exchange for an equity position in STMicroelectronics. In 1987 Petritz founded Simtek Corp. before retiring in 1998. Earlier he taught in academia and was employed by the U.S. Naval Ordnance Laboratory. Petritz was a Life Fellow of the IEEE.

Information for this column was obtained from the *The Complete Directory to Prime Network TV Shows 1946-Present* (4th ed.), *The Encyclopedia of Jazz* (1st ed.), *Hartford Courant, Investor's Business Daily, On the Air: The Encyclopedia of Old-Time Radio, www.broadcastingcable.com, www.cmt.com + www.dlr.com, www.emmys.com, www.guardian.co.uk, www.latimes.com, www.montreal.cbc.ca, www.nytimes.com, www.oscars.org, www.seattletimes.nwsource.com, www.theinstitute.ieee.org,* and *www.theworkcircuit.com.*

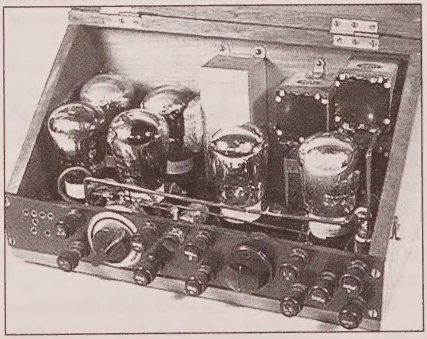
Thanks to Dr. A. David Wunsch for additional source material.

BREADBOARDING, *continued from page 39*

that can support most any kind of breadboarding project.

And I have a few reproduction audions left with standard bases. Price remains at $100 each postpaid. I'm told that K-R tubes, who made these in the Czech Republic, produced some repro WD-11s a few years ago. Four of those turned up on ebay last month, so maybe I can get my Radiola III-A running some day without spending a fortune. One reader wrote that he had installed FET amplifiers inside dud '99 bottles - way to go!

Note: Dick turned in this article before the appearance of our August issue, which contained Ken Owens' article (in "Equipment Restoration") on tubes that make good substitutes for the WD-11.—mfe



Any combination of the output amplifier's four output tubes (at left) can be selected by accessing various of the seven small receptacles at the left of the front panel.

EDITED BY **JOHN CASALE**, W2NI, 3 PICKERING LANE, TROY, NY 12180
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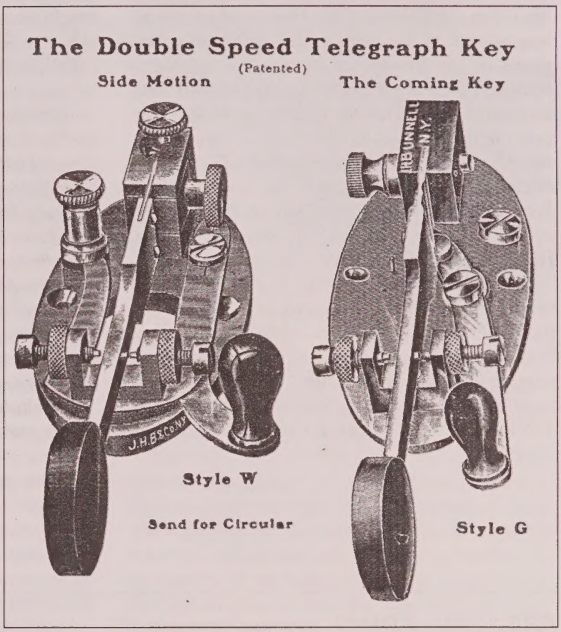
The Bunnell Double Speed Key: Was it Really Introduced in 1888?

The Bunnell Double Speed Key has been used by many historians as a milestone in the evolution of the key. It is considered the first successful horizontally-operated manual key and is considered to be the precursor of the semi-automatic key. It has been well documented by contemporary authors, both in print and on the web, that Jesse Bunnell invented this key and that J.H. Bunnell & Co introduced it in 1888. But did this really happen? The oldest examples do not really have the appearance of a key that was manufactured during the 1880's.

Looking through the telegraph journals from the late 19th century, you would think J.H. Bunnell & Co. would be heavily touting a key that could help telegraphers suffering from the strain of using a conventional Morse key. But I was not able to find a single Double Speed Key ad. No evidence was found in the text books of this era either.



The first ad showing both the "W" and "G" styles. From The Journal of the Telegraph, October 21, 1907.

One of the most comprehensive books on telegraph technology was *American Telegraphy* by William Maver Jr. The first edition of this book was actually published by J.H. Bunnell & Co. in 1892. In this edition, Maver illustrates Bunnell Steel Lever, Steiner and Victor keys, but there is no mention of the Double Speed Key. You would think such a radical new key design would certainly be mentioned by Maver in book published by the Bunnell company.

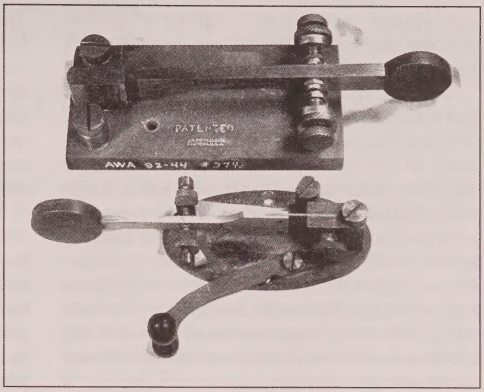
It was not until several years later that Maver began to mention its existence. Even more convincing is the fact that a search of the full J.H. Bunnell catalogs for the years 1889 and 1898 does not turn up a Double Speed Key. Finally, a search of patents issued during this era shows nothing resembling a Double Speed Key, either granted to Jesse Bunnell or assigned to the Bunnell Company.

So when was it introduced? The answer might be best understood by considering why the country's largest telegraph instrument manufacturer was motivated to introduce a horizontally operated key. The very first ad that I could find for the Double Speed Key was in the *Journal of the Telegraph*, dated November 20, 1904. If you think about what was going on in the telegraph industry late in 1904, the Double Speed Key's arrival at that time makes a lot of sense.

The interest in horizontally-operated semi-automatic keys was rapidly growing. Horace Martin's patent for his Autoplex was granted in June

of 1903; he was actively selling them during 1904. In January of 1904, William Coffe filed for his patent for an all mechanical vertical key. Beginning in January of 1905, the Mecograph Company, operating initially off of Coffe's patent, was advertising a semi automatic key. All this was followed by Martin's May-1905 introduction of the Vibroplex.

Two weeks after that first Double Speed Key ad appeared, a business announcement formally introducing the key was posted in *The Telegraph Age* of December 1, 1904. Titled "A New Telegraph Key," it stated that "J.H. Bunnell & Co., 20 Park Place, New York, have brought out a new telegraph key, to which has been given the name of "Double Speed."



Above: a Bunnell Double Speed Wireless Key; below: the "Style W" landline key. From the A.W.A. Electronic History Museum collection.

The following month, on January 28, 1905, John Ghegan, a long time telegrapher and inventor, who was the president of J.H. Bunnell & Co. filed for a patent for a legless, horizontally operated "Telegraph Key."

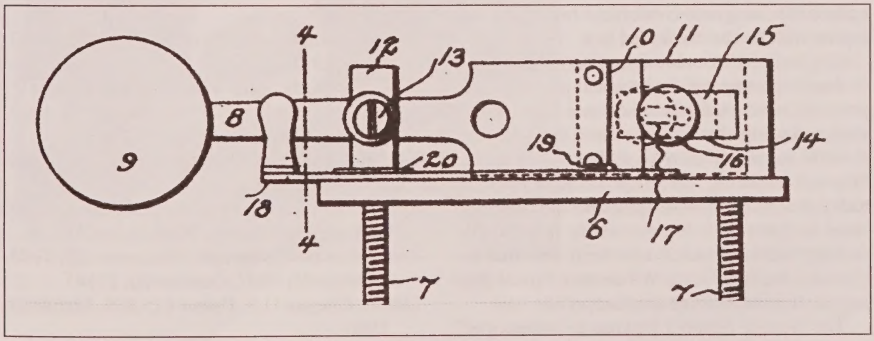
The object of his invention was "to provide a cheap, efficient, and simple telegraph key of the kind in which the lever is elastically mounted at one end and is preferably provided with a pair of contacts at the other end."

The first Double Speed Key, as introduced in 1904, was an all metallic version. It had a large hole in its brass base and an adjustment for the lever's spring tension. It is exactly what is shown in the Bunnell ad in this article as, "Style W." But when it was first introduced, the Double Speed Key had no style designation.

The "W" designation was not added until 1907—to distinguish that model from a second key in this series called "Style G." Some collectors have mistakenly claimed that the "W" stands for wireless but both the "W" and "G" styles were introduced as landline telegraph keys. The true Bunnell Wireless Double Speed key, a third key in this series, did not show up until the 1920s. It had larger contacts and no spring tension adjustment. It was mounted on a heavy base.

To me, the most intriguing part of the Double Speed Key's history is the meaning of the "W" and "G." At first I thought they were just arbitrary letter designations, similar to what Bunnell used in its catalogs to identify different dealer discount schedules. But now I believe their meaning is much deeper than that and at the very root of the Double Speed Key's origin. It appears the designations represent the last names of the inventors who designed the lever styles used in the two keys.

In the "G" style, the lever's leaf spring is anchored to a block of ebonite and it has no spring tension adjustment. This style is precisely the



Drawing from Roye M. Wood's November 29, 1904 patent showing lever and spring tension adjustment.

one shown in Ghegan's patent of March 20,1906. So I believe the "G" refers to Ghegan's name.

The "W" style has a spring tension adjustment and the lever's leaf spring is anchored to a block of brass. The person who designed this lever was Roye M. Wood of Chicago IL. On November 29, 1904, within days of the Double Speed Key's formal introduction, Wood received a patent for a horizontally-operated leg key that had a unique spring tension adjustment for its lever. In his design, a single thumbscrew holds two small brass blocks that grip the lever's leaf spring from both sides. When the thumbscrew is loosened the blocks can slide forward to increase the stiffness of the spring.

There is no documentation showing that the Bunnell Company acquired Wood's patent or obtained a license to use it. But there is no question that Wood's lever and spring tension adjustment are incorporated in Bunnell's "W" style key. A strong argument could be made that the development of the Double Speed Key series evolved from Wood's patent.

The Bunnell company had high hopes for the "Double Speed Key" design, which they termed "the coming key." Like the semi-automatics, it had the potential to help a telegrapher achieve two of his goals—higher speed and less physical strain. "Don't pay a big price for a mechanical transmitter until you have seen the merits of this simple, low-priced device...," early Bunnell ads mentioned.

There is evidence that this key was initially peddled to the "A1" telegrapher market. O.T. Anderson, whose name should be familiar to Vibroplex historians, was a well-known Chicago telegrapher and typewriter dealer as well as an early agent for Horace Martin. The young man (he was in his middle 20s) catered to first class operators. In January of 1905, he was specifically mentioning only two keys in his ad: the Autoplex and the Double Speed key.

Originally, the Double Speed Key was offered in three patterns: leg, legless, and portable. The portable pattern sold for $6.50 and came with a cord and wedge (and later a base) with the idea it could be carried to each shift just like a bug. When considering the rarity of the leg pattern today, it appears most telegraphers did try to use them as portables. Another rarity is a Double Speed "KOB." Bunnell also built sets that included a legless "Style W" Double Speed Key and an aluminum lever sounder on one base.

The Double Speed's nickname "sideswiper" was derived from the fact that the key was operated by the "sidewise rocking move of the hand." The key's high speed, as explained by the Bunnell Co., was possible because manipulating the instrument required only about half the motions of a conventional Morse key. For example, the letter "P" in American Morse (five dots) required ten movements of the hand, five down and five up. The Double Speed Key required only six (including the final release).

By 1914, Ghegan and the Bunnell Company were still trying to get a piece of the semi automatic key market with ads like: "For only $2.40 you can get a Double Speed Key and with a little practice do better work than with a high-priced bug." This seems a reasonable statement but, in fact, the key was unable to achieve the popularity and speed capabilities of the bug.

As it turned out, the "G" style was short-lived and thus is difficult to find today. The "W" style, with its spring-tension adjustment, proved to be more popular style and was produced by Bunnell for many years with some minor variations. Today it is still sought after by collectors and continues to have a loyal following of users.

The bottom line to all this is that J.H. Bunnell & Co. introduced the Double Speed Key late in 1904 at the same time when the semi automatic key was emerging. It was offered as a simple alternative in a new and competitive key market.

Credit for introducing all three Double Speed Keys should go to John Ghegan. History seems to have overlooked the Ghegan era of the Bunnell Company. However, even though the firm bore Bunnell's name, Ghegan's tenure as president and head of manufacturing was actually longer than Bunnell's. J.H. Bunnell passed away in 1899, but the number of different telegraph instruments that were signed off by Ghegan to go into production between the years of 1899 to 1926 was incredible.

SOURCES :

American Telegraphy, William Maver Jr., 1892, 1897, 1912

The Telegraph Age, March 1, 1900, June 1, 1902, December 1, 1904, January 1, 1905, April 1, 1906, September 16, 1906

J.H. Bunnell & Co. Catalogs #10, 17, 28, 29, and 30

The Western Union Archives, National Museum of American History, Washington, D.C.

Journal of the Telegraph, November 20, 1904, October 21, 1907, October 20, 1914

John J. Ghegan U.S. Patent 815,809, March 20, 1906

Roye M. Wood U.S. Patent 776,160, November 29, 1904

BY MIKE TUGGLE

DESIGNING A DX CRYSTAL SET

Long distance reception with crystal radios is once again becoming a serious pursuit among hams and other radio hobbyists. They are discovering that the DX capabilities of these receivers have been greatly underrated. I've been particularly interested in crystal sets since 1959, when I first discovered you could actually DX with them.

The Internet has aided crystal set DX activity by making exchange of ideas between like-minded enthusiasts much, much easier. This article only touches the surface from a personal perspective. The reader is encouraged to pursue the online resources, described below, covering all aspects and providing further examples of this fascinating hobby.

In this article I'll cover general design considerations for building DX crystal sets, but will leave the actual construction specifications up to you.

Equipment

Figures 1 and 2 show an example of a DX crystal set. I call it the "Lyonodyne-17." The design evolved from an earlier version described in the November, 1978 *OTB*. As you can see, this is not your grandfather's crystal set.

Antenna (right) and detector (left) tuners are mounted on the middle board. Wave traps are located fore and aft on separate boards, making it possible to adjust the coupling by moving the boards. The antenna coil (L1) is wound on a short ferrite rod. The matching transformer unit for my RCA "Big Cans" sound powered phones is at front, left.

So, what makes a crystal radio a "DX" set? Well, this one is double-tuned (L1-C1 and L2-C2) for selectivity to tune weak DX stations in the RF jungle we now live in. Some DX sets resort to triple tuning for even more selectivity — depends on how many hands you have to do the tuning. The wavetraps (L3-C3 and L4-C4) can be tuned to reject strong unwanted stations in the manner of the notch filter on a communications receiver.

Coils L2 through L4 are basket-wound litz wire for low loss and high Q. Variable capacitors C1 through C4 are highest-quality, silver-plated, ceramic-insulated units—as perhaps only the military could specify. All these components are isolated from the mounting board by ceramic standoff insulators. Overkill maybe, but why take chances?

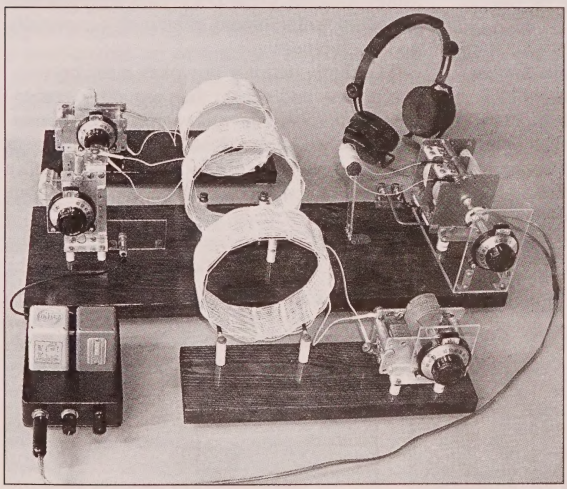


Fig. 1. The "Lyonodyne-17," an example of a well-designed DX crystal set.

Design Principles

Two fundamental principles underlie DX crystal set design and construction: use of low-loss components and proper impedance matching between stages.

Avoid the temptation to construct the set with vintage components. The result may be a handsome set that is only a fair performer. I have such sets, and they sit up on the shelf and look nice. However, for ultimate performance, one should rely on top quality (usually modern) compo-

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nents and materials.

This is especially important for tuning capacitors, coil wire and forms, and detector diodes. Layout and construction, particularly in the RF-carrying sections (antenna through detector), should follow good HF practices: short direct leads, careful insulation of components, and avoidance of switches, taps and other trappings in the 'hot', RF-carrying sections.

The crystal set, like any other radio, consists of a series of stages—each with a function, each coupled to the next. The stages of a simplified crystal receiver are diagrammed in Figure 3. The resistances shown are used for detailed circuit analysis that will not discussed here.

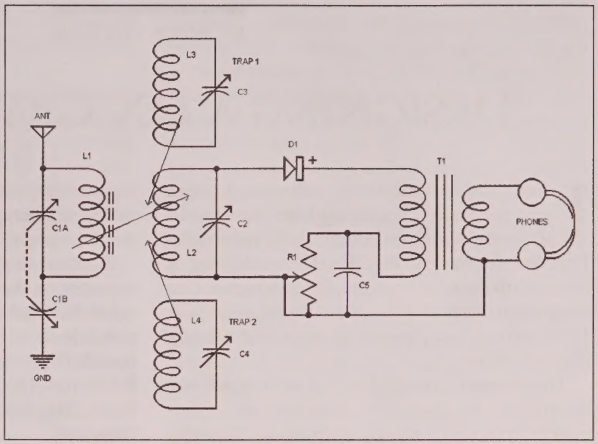


Fig. 2. Schematic of the "Lyonodyne-17."

We have, from left to right: antenna-ground system, front-end (antenna) tuner, secondary (detector) tuner, diode detector, audio matching and finally, phones. Maximum transfer of available signal power from one stage to the next happens when the impedances of these stages are matched to each other—from antenna to phones—and indeed, from phones to one's ears.

Components

A good outside antenna-ground system is essential for DXing. Loop antennas do not have enough pickup to be effective. An inverted L longwire 20 to 30 feet high and 50 feet long is a good start. The one truth to antenna design is, "higher is better." Any effort expended to raise the antenna, even a few feet, will be amply rewarded. In the most recent crystal set DX contest a third design principle emerged: A huge antenna can overcome shortcomings in the first two principles.

The winner suspended 140 feet of litz wire near vertically using helium-filled balloons. Another high-scorer just happened to have a 140-foot tall base-insulated tower and four 1000-foot Beverage antennas to complement his junk box set. Most of us have neither the real estate nor the rigging capability to put up one of these 'mega' antennas. So it behooves us to heed principles 1 and 2.

The front-end (antenna tuner) design shown here is one of several that can be used. This particular design tunes a wide variety of antenna-ground systems. Other DX crystal sets use a simple series tuning circuit effectively—especially on long antennas.

The diode detector provokes more mystery, controversy and debate than any other component. Some folks favor low-resistance germanium diodes like the 1N34A or rock stands with galenas. Others swear by high-tech Schottky diodes. The emerging truth is, there is no universally perfect diode.

The 'best' diode depends specifically upon the set it is used in. Per the second principle, the

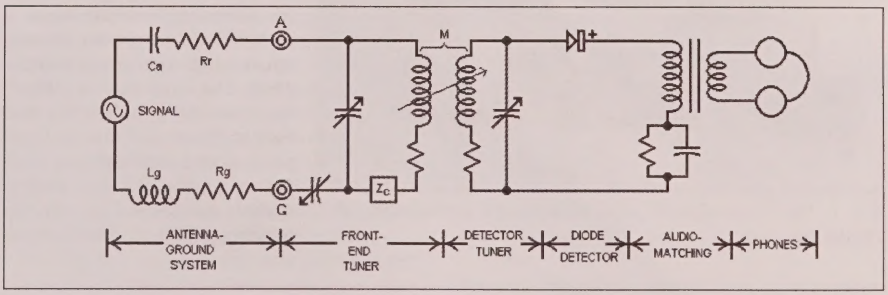


Fig. 3. The stages of a typical DX crystal set (see text).

diode needs to match the tank circuit feeding it and the transformer and phones that it feeds. With some care, a high-Q tank with litz wire coil and a modern, military-grade variable capacitor can attain a resistance of from several hundred kilohms up to a megohm. Only Schottky diodes and a few modern germanium diodes have resistances this high. The old catswhisker-rock stand detectors have far lower resistances.

The most practical approach to selecting the right diode is to apply an A-B listening test to a number of them. Two diodes are mounted in a test stand arranged to quickly switch between them. Using a fairly weak station, one can test a pile of diodes, pair-wise, keeping the winner after each test, until the ultimate one is found. But it's most important to realize that this diode is 'best' for the particular set it was tested in. It may be a quite poor performer in a different set.

Surplus, sound-powered (more properly, balanced-armature) phones have become the industry standard for DX crystal sets. Baldwin Type C's were an early example. Now, post-WWII surplus units made by RCA and US Instruments Corp. (USI) are preferred.

These phones are low impedance and must be matched to the high-impedance tank (L2-C2) and detector diode by an audio transformer having, typically, 50- to 600-ohm and 50- or 100-kilohm windings (Figure 4). The quality of the transformer is very important, so that its insertion loss is small. UTC input transformers have a good reputation for low loss. The final touch is a comfortable set of headphone cushions for good acoustical coupling to the ears and exclusion of outside noise.

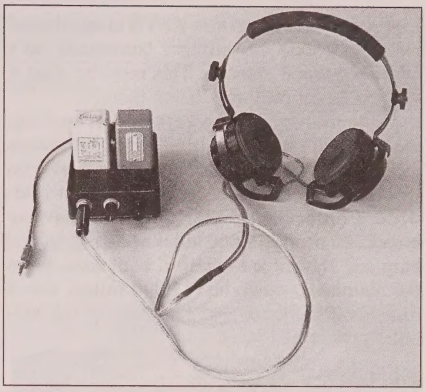


Fig. 4. RCA balanced-armature "phones," with matching transformer.

DX Experiences

Under favorable conditions, medium wave or broadcast band DX crystal sets can receive hundreds of stations—some of them thousands of miles distant. In fact, DX crystal set performance is comparable to any other radio (powered or not) short of a full-blown communications receiver with its own outside antenna. The rule of thumb is, if you can hear them on a radio, you can hear them on a crystal set.

The best times to listen are at sunrise and sunset, when stations are signing on or off, raising or dropping their powers, and changing their antenna patterns. These circumstances make for a jumble of regional stations ripe for the picking. Deep night is usually the best time for flat-out DX.

In 15-year stints at two locations in Maryland, I accumulated logs of over 600 and 400 stations, respectively. The most distant receptions, at 1800 to 2200 miles, were a few powerful stations in the Caribbean area and adjacent South America. I was aided, no doubt, by the largely water path between them and me. The farthest overland station was in Denver at about 1500 miles.

When I moved to Hawaii, I wasn't sure what to expect. The local Honolulu stations were givens. But what about the outer islands? And all-importantly the next stations, mainlanders, the closest some 2400 miles away? As it turns out, Hawaii is an ideal DX location—for distance if not for sheer numbers of stations. With no regional stations, sunrise-sunset activity is non-existent.

West coast 500-watt stations, 2500 miles distant, have been heard here. High-power stations in Cuba (4800 mi.) and the Caicos Islands (5500 mi.) have also been heard, thanks to a mostly water path. Stations from the "interior" also make it over.

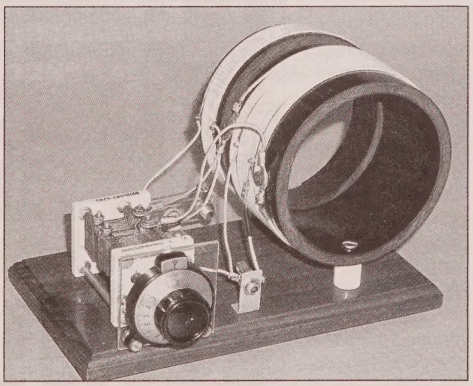


Fig. 5. A "12,000-mile" short-wave receiver.

Last year, it was neat to hear KRVN in snowbound Nebraska (3600 mi.) using a homemade cat's whisker mineral detector. This must be what it was like in the old days.

With low station powers and crowding, medium-wave broadcast band DXing represents the greatest challenge. On short wave there's no limit to the distance—reception is truly worldwide. I occasionally hear the South African broadcasts nearly 12,000 miles away; Johannesburg and Hawaii are nearly at antipodes. From the mainland, Australia (11,000 miles) was a routine catch. Figures 5 and 6 show my "12,000-mile" crystal set.

Crystal Set DX Activities

Crystal set DX activities include discussion forums sharing ideas and results, an annual DX listening contest now into its sixth year, and the occasional set-building contest where some remarkably high-caliber craftsmanship comes to the fore. All of these activities are served up on the Internet.

The following site is a highly recommended grand portal to the wonderful world of crystal set DXing: Owen Pool's Crystal Radio Resources at http://www.thebest.net/wuggy. The comprehensive set of links here covers all aspects of the hobby. This site is headquarters for the annual crystal set DX (XSDX) contests open to everyone. The contest usually takes place in late January. Watch for announcement of specific dates and rules.

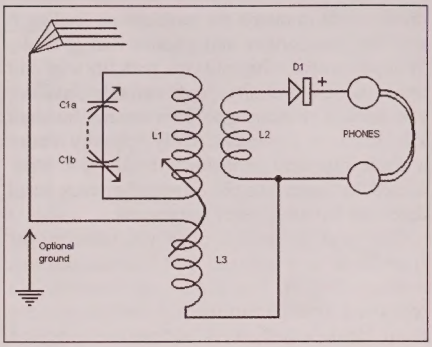


Fig. 6. Schematic of the "12,000 mile-er."

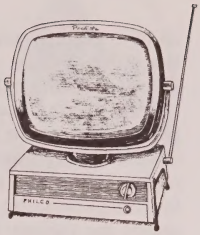
My own experiences over the years have led me to shed my skepticism of the incredible DX reports made by old-timers back in the early days. Component technology was not what it is today, but circuit technology was, and the sparsely populated bands back then had to be a lot more DX-friendly. You may want to pull an antique crystal set off the shelf and give it a spin. I'd encourage it.

Some of these old sets are extremely well built. The construction of the military BC-14A/SCR-65 never ceases to amaze me—and others were built just as well. But to start out, I'd recommend conceding to modern technology by using a good, modern diode and sound-powered phones with matching transformer. With just a little luck, prepare to be amazed all over again!

CROSSWORD ANSWER KEY —From the Junk Box Crossword, page 36

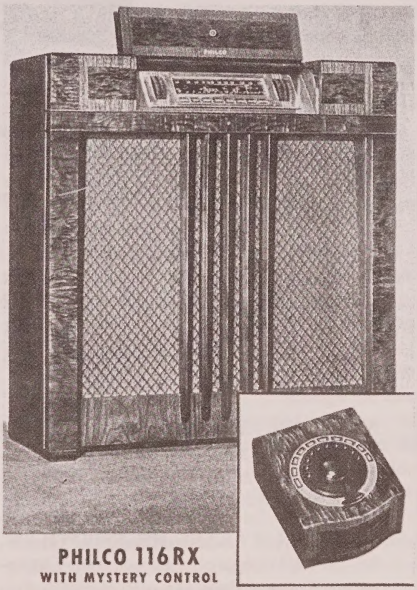
TELEVISION

EDITED BY **RICHARD BREWSTER**, 145 LITTLE PECONIC BAY ROAD, CUTCHOGUE, NY 11935 *PLEASE INCLUDE SASE FOR REPLY.*



The Philco Mystery Control: Forerunner of the TV Wireless Remote

As you are reading this, I am back on board the all-volunteer-crewed M/V Anastasis *hospital ship on the way to deliver relief supplies to Liberia, West Africa. Then we will return to Sierra Leone where the Mercy Ship will be docked until next June, serving the medical and humanitarian needs of the people of that country. I'll be busy in the Engineering department, helping to maintain the electronic systems of the ship. As editor of the TV column, I am always looking for contributions and can be contacted via email, <brewster@mercyships.org>.—rb*



PHILCO 116RX
WITH MYSTERY CONTROL

Who would buy a tv without a wireless remote control? But long before the "remote" was commonly available on television sets, it showed up on a radio. In 1939, Philco began marketing a console radio with a wireless remote called the "Mystery Control."

Then why wasn't wireless remote standard on tv sets till much later in the tv revolution? Actually Zenith had a remote control system called "space command" in the 1950s. It utilized a light beam and photocell (later an ultrasonic signal) with the tones generated by a handheld mechanical clicker. It worked well as I recall. But I believe that it wasn't popular for several reasons.

Families typically watched the same channel for the whole evening - imagine that! - and presumably commercials weren't nearly as annoying then as they are now, so even the mute was not considered necessary. And there were only a few channels. Some folks only got just one or two. Growing up in the New York City area, we were privileged to receive seven channels even as early as 1949 when we got our first set. But I believe that the real reason for the resurgence of interest in the tv wireless remote was cable tv. With so many channels available, there is the strong tendency to want to "channel surf." In addition, infra-red solid state controls have become very inexpensive.

Back in 1969, when I worked for Westinghouse, a small group at my location was developing an infra-red remote control system using LEDs. That, of course, is the preferred system for most of the wireless remotes now in use. Lately rf is sometimes used, echoing the system chosen by Philco in 1939.

Strangely, a Philco remote control transmitter was one of the very first items in my collection, having been saved from my childhood junk picking! Many years later I acquired and restored the Philco 116RX which it controlled. The Philco 116RX is a really neat set. The one I restored in the early 70s worked so well that I could go out into the yard, at least 100 feet away from the set, and still control the volume, change preset stations and even turn the radio off. But once off, it could not turned back on except at the set.

The 9"× 7"× 6" remote unit uses a type 30 tube with 3-volt and 45- volt batteries in a simple oscillator circuit. The oscillator is pulsed by a telephone-type dial. These rf pulses are picked

up by a loop antenna in the cabinet base and processed by an auxiliary 5 tube short-wave receiver on the main radio chassis. A stepping relay (enclosed in a large sound-insulated container) which selects the stations, is controlled by a 2A4G thyratron tube, surely unique for a home radio!

Those guys at Philco were pretty clever. Later, they

came out with two of our favorite collectibles: the first battery operated tv in 1959 and the famous Predicta.

Unfortunately, I disposed of the 116RX due to lack of space. I did save the original remote unit and a few years ago acquired another Philco 116 RX that I plan to restore someday! It shall remain an unusual part of my eclectic tv collection.

SILENT KEYS

We record the passing of the following AWA members with deep regret.

KENNETH V. BLAKEMAN (8-30-03) lived in Fulton, NY and was an electronic technician for General Electric from 1946 until his retirement in 1986.

JOHN ALLAN BRYANT lived in Madisonville, KY.

MARION J. CHELKOWSKI, 88, (2-2-03) was owner of Radio & Television Parts Company and lived in San Antonio, TX. Earlier he operated a business in Laredo, TX.

JOHN "J.C." SEARS HIGINBOTHAM, 81, (7-5-03) began his career with Canandaigua National Bank as a mail carrier and retired as Vice President and Manager of the bank's Honeoye Branch. He was involved in numerous historical preservation activities and for many years was a volunteer guide at the AWA Electronics Communications Museum.

RAY W. LARSON, 70, ex-W9QBM & K6VFD, (2-9-03) was a prototype development technician for early ruby laser systems and xerographic devices. Larson was awarded three patents while working for Xonics, Korad Lasers and Hughes Aircraft. His article, Two-Tube Heaven, was published in *The OTB* (August 1995), p. 34.

DR. JAMES A. MAXWELL, 69, W6CF, (2-6-03) was a retired technical consultant and had been the Pacific Division Director for the American Radio Relay League since 1999. (For additional information about Maxwell see *The OTB* (August 2003), p. 23.

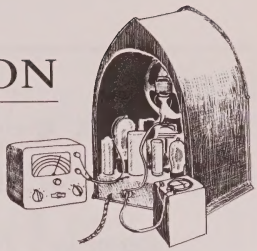
EVERETT I. MUNDY, 79, WA3JTU, (6-29-03) cable television executive. He was a co-founder and co-owner of the Tele-Media Corporation. From 1996 until the present Mundy served as Vice Chairman. He was inducted into the Cable Television Pioneers in 1988. Mundy began his career at Piper Aircraft in 1944 as a communications electrician and commercial pilot, constructing and testing prototype aircraft.

DR. RICHARD A. RHODES, II, 81, (5-9-03) retired as a Physics Professor from Eckerd College (formerly Florida Presbyterian) in 1994. He previously held teaching positions at the University of Connecticut and University of Florida (Gainesville). Rhodes earlier taught physics for an Army unit at Bowdoin College in Brunswick, ME and worked for the Sound Division at the U.S. Naval Research Laboratory in Washington, D.C.

Note: AWA officers and members are being asked to submit all information about Silent Keys to Joyce Peckham, Box E, Breesport, NY 14816. This will help in the collection and coordination of information and appropriate recognition of both AWA members and others who have made contributions to the electronics and entertainment industries.

EQUIPMENT RESTORATION

EDITED BY **KEN OWENS**, 478 SYCAMORE DR., CIRCLEVILLE, OH 43113
radiowd11@yahoo.com
PLEASE SEND CORRESPONDENCE DIRECTLY TO THE ABOVE ADDRESS, INCLUDING SASE FOR REPLY.



Two Case Histories and a Pot Metal Fix

It is encouraging to hear that some of the material published over the years in this column has been of use. It makes the effort worthwhile. Such is the case with John Kaetz (Bessemer, AL) who writes:

I recently repaired a 7-tube 1930 Majestic 130A chassis with a 24A biased detector driving a pair of 45s. After much power supply work, the set came to life, but had the audio quality and volume of the "two cans and a string" telephone.

The original audio transformer had been replaced years ago with a 1:4 ratio unit. It was good and all voltages were correct, but signal tracing could not find any "good" audio. It occurred to me that the ratio was too low for good volume and the primary inductance might be too low for good bass response.

Reference to the *Radiotron Designer's Handbook* (3rd Ed.) showed that a triode of 10 kΩ plate resistance needs a primary inductance of 21H to be down only 2 db at 100 Hz. A tetrode of 100 kΩ plate resistance needs 210H inductance for the same response. Needless to say, neither this nor any modern replacement of the A53C variety comes anywhere close to this value.

I built the push-pull solid-state circuit described in the *OTB*, V. 44, #3, p. 23 and replaced the transformer with it. The results were astounding! Bass was much improved and the sound quality was good. I used a 82 kΩ plate load resistor and a 6.8 kΩ emitter resistor for a gain of 9 which drove the P-P 45s to ear-splitting volume.

I did not use heat sinks because measurements at a supply voltage of 265 showed a dissipation of 0.6W for the amplifier stage and 0.4W for the splitter. After 30 min operation, either transistor tab could be held comfortably.

♦ ♦ ♦ ♦

John also tells how he repairs pot metal problems in the tuning capacitors of Majestic receivers. This approach might also work on early Zenith sets I have seen with similar problems.

Many Majestic models use a steel frame and rotor shaft on the variable capacitor, but the stator and rotor plates are embedded in pot metal. The stators are attached to the frame with insulating anchor strips. The pot metal often swells above the anchor strip mounting screws causing the stator plates to fan out. They then will not mesh with the rotor plates. I have used the following procedure to correct the problem in several Model 70s and a Model 181.

Remove the rotor and shaft assembly. This is fairly easy except that the drive drum can be stubborn. Disconnect the wires to each stator and remove the 2 mounting screws on each side allowing them to be lifted out.

A drill press is almost a necessity for the next step, which is to drill a 7/64" hole through the casting perpendicular to the plates and just above the mounting holes. Drill the hole about 1/4" from the outside edge of the casting. Do this on both sides of the stator assembly. You will need a way to hold the assembly firmly while drilling and a lubricant is recommended to keep the drill from grabbing and wandering because pot metal varies in hardness.

Next, clamp the assembly in a bench vise and, using a hacksaw with a 24 to 32 tpi blade, saw through the pot metal at the center of the casting between and parallel to the plates to within 1/8" of cutting the assembly in half. Pass #6-32 screws of correct length (2" in my case) through the 7/64" holes you first drilled, put nuts on them and tighten until the saw kerf is closed. The remaining 1/8" of pot metal may fracture, but this doesn't matter now.

Cut off the excess screw length. It may be necessary to file down the nuts on the section nearest the dial drum to provide clearance.

The fan condition is now much reduced and further corrections can be made by bending plates. I was successful in restoring 12 stators to operation by this cutting and bending procedure. [*Extreme cases may require additional saw cuts. Ed.*].

Calibration is affected to some extent because the plates on each side of the saw cut are now

(continued on page 57)

BY BILL FIZETTE, W2DGB

A STRUCTURED APPROACH TO FIXING UP THOSE NICE OLD RADIOS

Restoring a 1930s National SW-3 Regenerative Receiver

In "The Communications Receiver" for this issue, you'll find a review of the famous National SW-3. In this article we will go through the procedures that were used to restore a rather decrepit specimen that was purchased in the flea market at the 2002 Annual Conference.

While all the major parts were there, a number of them were laying loose in the cardboard box it came in, including the two-gang tuning capacitor and the gain control. Missing were the antenna trimmer capacitor, the gain and regeneration controls, the main tuning dial, the two decorative National knobs, the power cord and plug, and a tube shield, some of the mounting brackets and other miscellaneous hardware. The metal work was rusted badly enough to warrant a complete refinishing.

On the plus side, the difficult-to-replace S-101 audio coupler was said to be good. All in all, it certainly qualified as an interesting project, and will serve to illustrate to a beginner some of the basic procedures used in "fixing up those nice old radios."

First Steps

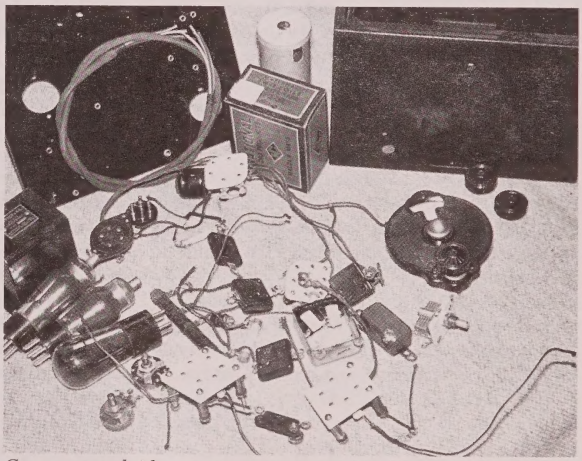
Two situations had to be resolved before any work could begin; these were acquiring the paper work and obtaining the missing components. The items needed for the former consisted of a circuit diagram, a manual, and notes and sketches of the unrestored chassis. For the latter, we needed the parts already mentioned plus a power supply and tubes.

To refinish the metal work it was necessary to strip all the parts off the chassis. This was done slowly so that detailed notes and drawings could be made of all the parts and their inter-relationships as well as the wiring. The original black hook-up wire was saved for reuse where possible.

All parts were then methodically cleaned and checked. The two bathtub capacitors under the chassis were found to be bad, and were gutted so that good modern parts could be placed inside. One hint: If you can locate a good example of the set you are restoring, by all means have it available to check parts layout and wiring hookups. This can be an important aid, especially with a regenerative set where the various grounds are so important.

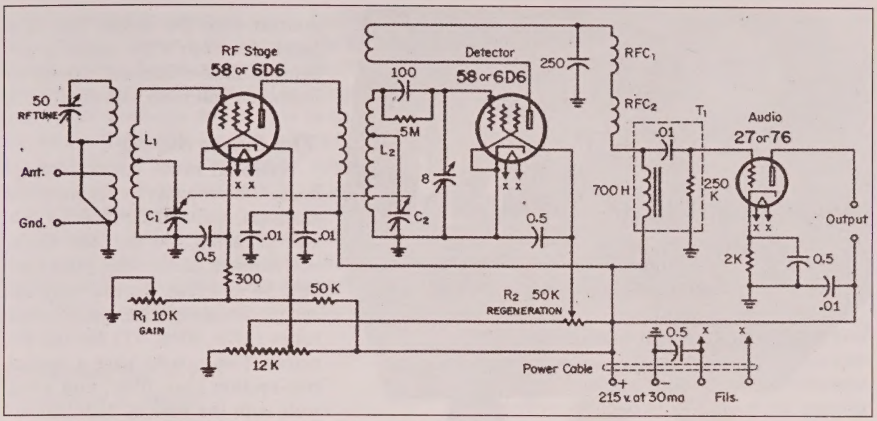
The Metal Work

The rusted sheet metal parts were sandblasted and then repainted: the inside with a gloss black and the outside with a black crackle. Painting is more of an art form than a science, and some folks are much better at it than I am, especially with black-crackle. My suggestion is to buy only the best materials, and then have someone who knows show or tell you how to do it.



Components laid out prior to reassembly. The tuning capacitor and the gain control knob are not in this picture.

AUTHOR'S ADDRESS: RR 1, BOX55, HENRYVILLE, PA 18332
e-mail w2dgb@enter.net



Circuit diagram of the Model 2 AC version of the SW-3, the most common one, shown here with 2.5-volt tubes. See text. Source: Wm. Orr—CQ Magazine.

In any event, it is difficult to match the original factory job of 70 years ago using the techniques and materials available to the restorer today. But you can at least end up with a product that looks decent.

The two missing metal brackets were bent up out of scrap aluminum and painted. Modern pan-head sheet-metal screws were sand blasted and painted black to replace the missing ones.

Other Parts

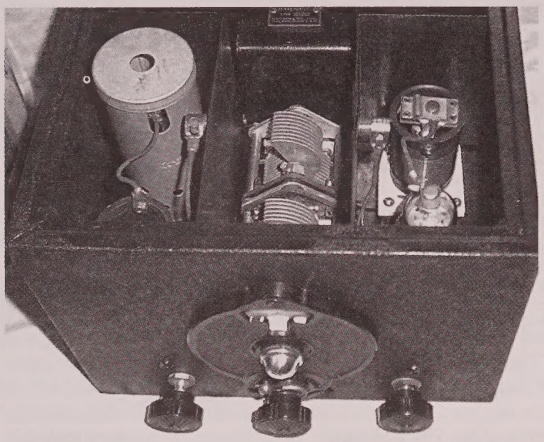
The S-101 coupler (the part that looks like an audio transformer in the center rear of the chassis plate) was indeed good and could be used as is. I just needed to give it a good outside cleaning and repainting with the label carefully masked off. For those who might need it, general information on how to repair an S-101 is included at the end of this article.

All capacitors and resistors were carefully checked, and in this set, for the most part, they were good. However, the detector grid leak was out of spec (maximum of plus or minus 20%) and was replaced with a modern resistor on the premise that it would give quieter operation. The main B+ voltage divider was found to have one leg open, and rather than replace the whole unit with a modern unit with adjustable taps, the open section was simply bridged with a 6900-ohm, 10-watt wire-wound resistor.

The unique four-wire power cable was duplicated by using a large brown cotton shoelace as a cover over the wires. The ends were seized up with heavy thread, and a standard four-prong male power plug attached.

Range (kHz)	Universal Model 3	Model 2	Model 1
90-160	42	72	22
150-220	41	71	21
190-280	40	70	20
250-390	39	69	19
320-650	38	68	18 (purple)
500-900	37	67	17 (yellow)
690-1500	36	66	16 (orange)
1500-2700	35	65	15 (blue)
2500-4500	34	64	14 (green)
4200-8000	33	63	13 (white)
7000-12000	32	62	12 (red)
12000-21000	31	61	11 (black)
19000-35000	30	60	10 (brown)

General coverage coil chart for SW-3 Models 1, 2, and Universal 3. Additional coil sets provided bandspread tuning of ham bands. Source: Wm. Orr—CQ Magazine.



A look into the interior of the reassembled SW-3.

All parts were brush-cleaned with soap and warm water, and any excess solder was cleaned off. All hardware was either replaced or wire brushed to remove the accumulated crud (I use a fine rotary wire brush in an electric drill, mounted in a bench vise). Missing parts as detailed above were located and added to the box.

Coils were borrowed from another set, and tubes selected to match the power supply (see below). Having an aversion to placing headphones carrying over 200 volts DC on my ears, I elected to mount a small audio output transformer inside a speaker cabinet and use that for the output. This resulted in rather weak audio, and headphones matched to the speaker transformer would work better.

The Rebuild

I simply don't trust any soldered connections that were done in the 1930s. It is general practice here to redo each one, examining it under a strong light and a magnifying glass before proceeding to the next one. The guiding principal is that it is easier to do it right the first time, so take your time.

Following my notes, and with another SW-3 to refer to (not necessary, but darned helpful), the SW-3 was reassembled as if it was a kit. Since this is a simple set, and there are not really many parts, no major problems were encountered. However, it was important be sure that the coils and tuning capacitor—including the various grounds—were wired exactly as they were originally done.

Since the metal work was painted, I used a sharp-edged star washer under each ground screw to cut through the paint and make good contact with the metal. This is a good idea even if the metal is not painted, since oxides that can act as insulation will form with time.

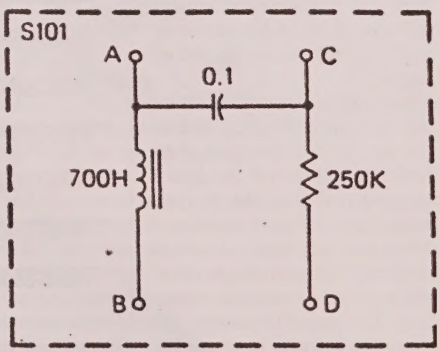
The Power Supply

National made several "doghouse" power packs for regenerative receivers, including the 5880 for 2.5-volt filaments, and the 5886 for 6-volt filament tubes. Since I had a rebuilt 5886, I took the easy way out and used it, along with a set of 6-volt tubes (6D6, 6D6, 37) for the receiver. These packs have a special two-section hum filter, and work well with the various National regenerative receivers from the 1930s. However, one SW-3 restorer[1] informed me that he has had better luck using a voltage-regulated power supply.

One precaution should be noted. If you have a 1941 SW-3 Universal, be sure to disconnect the balancing filament resistor from inside the power pack.

Results

Using a Variac, I slowly applied power while measuring the B+ line. This rebuilt pack, with new electrolytics, supplied about 220 VDC, somewhat above the recommended 180 volts, but still useable. The "smoke test" was satisfactory, and a test signal in the 75-meter band was used to set up the coils. Signals were heard from the first try, but the regeneration was noticeably weaker than needed for today's strong signals. Coils for the 80, 40, and 20-meter amateur bands, as well as the broadcast band, were tried, and signals received on all frequencies. These



Circuit diagram of the S-101 interstage coupler. Source: Wm. Orr—CQ Magazine.

older regenerative receivers can be fussy, and at this writing, I haven't yet invested the time required to tune the set properly. Some of the regeneration problems might well be related to the coil tickler windings, which have to be wound for the particular SW-3 model with which they are used. In this case, "60s series" coils are required. Some of my coils are not marked and may be the wrong type.

Aside from that I consider this project to have been a success. Many of the basic techniques outlined in this SW-3 restoration can certainly be used for the restoration of any of "those nice old radios."

Repairing the S-101 Interstage Coupler

It is entirely possible that you will find an S-101 that has one or more components bad. What to do? Definitely do not discard the unit, since they are very scarce and are repairable. Referring to the diagram and to your unit, you will see the four connections, which for convenience are labeled A, B, C, D.

To check the coupler, the four leads should be disconnected from the set. Although any of the three parts can be bad, the 0.1 mfd coupling capacitor is the usual offender. If it is leaky, open, or shorted, mount a replacement capacitor and resistor outside the box under the chassis, and tape up leads C and D. If the 700 Hy choke is bad (i.e., it won't pass DC) then it will be necessary to take the S-101 apart. First drill out the eyelets from the bottom side, remove the bottom plate, and then gut the case.

A replacement audio choke can be inserted in the case along with a new capacitor and resistor, and the unit closed up. Hammond makes 70 Hy audio chokes, I am told, and two in series will fit inside the case. Or you might even find a surplus audio choke from WWII stock.

If you wish, the black filler material you scraped out can be melted and poured back into the case. Replacement eyelets can be obtained from a shoe repair shop if you feel the need to have them.

The lesson here: It is possible to repair an old radio component in such a way that the repair is not noticeable from a casual inspection, and the more rare the part, the more desirable it is to take this approach.

REFERENCES

[1] Paul Bohlander, W3VVS, personal communication.

EQUIPMENT RESTORATION, *continued from page 53*

closer together increasing capacitance. If all stators are treated the same, however, the error will not be significant.

♦ ♦ ♦ ♦

This encounter with a car radio was sent by Leonard Aquilino, Jr. (Cicero, NY).

Recently a customer brought in a 1947 Cadillac radio complaining of poor audio, nonfunctional tuning dial and SMOKE! All tubes and the vibrator were tested and were good except for a 6V6 which had a heater-cathode short.

After removing the shielding to expose the power supply wiring, I could see the source of the smoke. The buffer capacitor had blown out both end connectors and gobs of wax coated everything. Fearing that the power transformer might have been damaged, I tested it by applying 6V AC to the primary with a dummy load on the secondary. Good high voltage with sufficient current indicated a healthy transformer. These transformers are designed to operate at 115 Hz, so the test must be conducted quickly when using 60 Hz to avoid overheating.

The rest of the work was straightforward. Many bad capacitors were replaced, a new 6V6 was installed, the chassis was cleaned up and a new dial cord strung. At this point, the reason for the non-functioning dial pointer was discovered.

The dial on this set has a glass cover plate with a plastic plate carrying the dial markings behind it. The pointer travels in the space between the two. The plastic plate had bowed outward trapping the pointer between it and the glass.

I made a miniature arbor press with a ¼" bolt pressing on the crown of the bow. The assembly was placed on a black box and put out on the blacktop driveway in the sun. This "solar oven" reached 150°F. Each day the bolt was turned in a little more until the plastic plate was straight. After cooling, the plate stayed straight and was put back in the radio which performed as good as new.

BY JOHN ANDERSON

THE GENERAL ELECTRIC XR-1-A

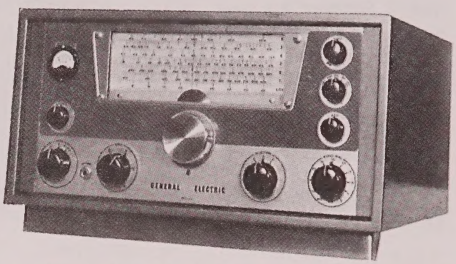
Immediately after World War II most of Walter Baker's Electronics Department at General Electric was moved from Schenectady, NY, and Bridgeport, CT, to Syracuse, NY to establish Electronics Park. In addition to the support divisions, the core of the manufacturing business comprised the Receiver, Transmitter, Specialty and Tube Divisions.

In 1946, International General Electric (IGE) asked to have products developed for sale overseas. For the most part the products requested were a line of transmitters (up to 100 kW) for general broadcasting and point to point communications. But there was also a request for a general-purpose communications receiver with rather ambitious specifications. It was to have "...a frequency range of 200 to 550 kilocycles and 2000 to 23000 kilocycles. It is being designed [1946 Annual Report of the Transmitter Division] for continuous operation in any climate in the world. High-grade hermetically-sealed components are being used throughout the design."

A special "IGE" section headed by Walker (initials not known) was set up in the Transmitter Division. Engineers Moncrief and Malheiros were assigned to the communications receiver, designated Type XR-1-A. By 1947 two prototypes had been constructed and a requisition for 1000 units placed by IGE. The attached photos show the prototype and, presumably, the two responsible engineers.

Manufacture began in the Specialty Division during 1948. In 1949 a reorganization saw George Metcalf, who had been head of Specialty, assigned to a consolidated division which absorbed the Transmitter Division. IGE asked that the unit servicing their needs be disbanded, and the various projects reassigned.

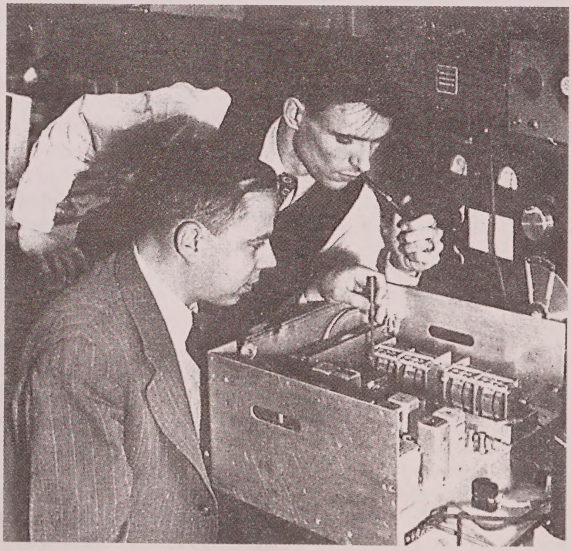
The XR-1-A receiver went with transmitter engineering. Meanwhile 50 receivers, with their speakers, were in production, with the first units ready for shipment. It is not known if the rest of the expected 1000 units were actually built and shipped.



Prototype of the General Electric XR1A1 receiver.

Has anyone seen one?

The information and pictures here came from the Annual Reports of the Transmitter Division, Engineering Section, for the years 1946-50. They are on file at the Schenectady Museum, Schenectady, NY.



The prototype receiver under test. The engineers shown may be Moncrief and Malheiros.

AUTHOR'S ADDRESS: 17 CEDAR LANE, SCOTIA, NY

BELOW 535

EDITED BY **FRANK LOTITO, K3DZ**, 1428 O'BLOCK RD., PITTSBURGH, PA 15239

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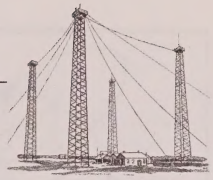

The Unilateral Receiving Loop Antenna

We discussed a few basics about the receiving loop antenna in last month's column—including its figure-8 shaped "bi-directional" pickup pattern. Because of that pattern, we may not be able to determine the direction that the signal is coming from when we rotate the loop for minimum signal[1]. Also, the interference-reducing potential of the loop antenna will definitely be negated if the receiving location is between the interfering signal and desired signal.

In this article we'll build on the previous one by discussing the unilateral receiving loop antenna design of the 1920s as used in direction finding. Radio direction finding goes back to at least 1888 when Heinrich Hertz constructed equipment to demonstrate the direction of arriving radio waves (reference 1).

First we need to define some terms related to the polar plot of Figure 1. It represents the "flat earth view" of the loop antenna's figure 8 pickup pattern as we rotate the loop about its vertical axis, as shown in Figure 2[2]. Figure 1 can also represent the loop pickup if the loop is fixed, but the signal source is rotated around the loop at a constant radius (distance) as shown in Figure 3[3].

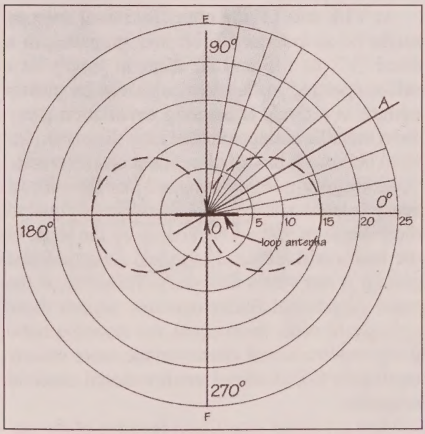

Figure 1. Pickup pattern of simple loop antenna.

The view of Figure 1 is a two-dimensional plot giving angle (azimuth or direction) and signal strength. Both Figures 2 and 3 are isometric views where we try to give the illusion of 3 dimensions. Note, for all three figures the 0°/180° and 90°/270° axes lie on the surface of the "flat earth."

Where are the magnetic or true north compass headings N (north), S (south), E (east) and W (west) in Figures 1, 2 and 3? Where is the ship's bow (or for aircraft application, the plane's propeller) pointing on Figures 1, 2, or 3?

For maritime applications, the radio direction finder loop antenna has a bearing pointer that is commonly superimposed on a slaved gyro compass card. Depending upon the system in use, the gyro compass card reads either magnetic or true north. A second pointer is included that indicates the ship's heading. (Ditto for aircraft application.) Thus, in Figure 1, the 0°/180° and 90°/270° axis could be the gyro compass card's N/S and E/W indications.

For the purposes of the following discussion, the first 90° of this plot has been divided is divided into 9 equal angular increments. This makes each increment equal to 10°. The concentric rings represent signal strength, or just simply received voltage. In this example, let's make each ring equal 5 volts.

Suppose we consider a receiving loop some distance away from a transmitter. Let's orient the signal source on the 0° and 180° line and to the right of 0° as shown in Figure 2. If the loop were connected to a RF amplifier, and the amplifier's output connected to a RF voltmeter, the figure 8 pattern of Figure 1 would represent the RF voltage observed as we slowly rotate the loop counterclockwise.

Starting at 0°, the RF voltmeter would indicate (picking an arbitrary figure as an example) about 15 V. Rotating the loop 30° counterclockwise to line AO, the RF voltmeter might indicate about 13 V. If the loop were to be rotated to the 90°/270° line, the RF voltmeter would indicate 0 volts. Continue to rotate counterclockwise beyond 90° and the RF voltmeter would begin in-

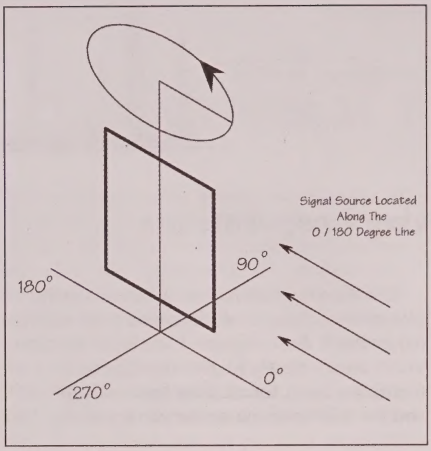

Figure 2, Rotating the loop about its vertical axis.

dicating again, tracing the other half of the pattern. A similar effect would be noted if the signal source were to be rotated around a fixed loop as shown in Figure 3.

How would we know if the signal source is located to the right or left of center on the 0°/180° line? For some maritime applications the ambiguity caused by the loop's symmetrical figure-8 pattern can cause significant, even disastrous, navigational uncertainty. For example, if a ship is steaming from Europe to New York City, and the loop directional finder system is monitoring a land based NYC maritime beacon station, there is no ambiguity. The ship must be east of NYC.

But now let's say that you are in the middle of the Atlantic Ocean and the loop system is used to monitor a SOS. A signal minimum is noted

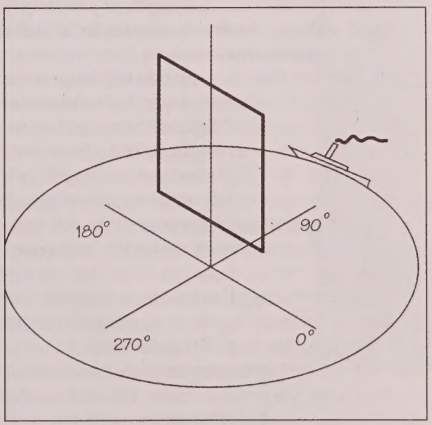

Figure 3. Rotating the signal source at constant distance around the loop.

when the loop is broadside on the NE/SW compass heading. Now there is an ambiguity. The ship's master needs more information in order to determine which direction to steam, NE or SW. How is this ambiguity error minimized?

It can be done by adding the responses of the directional loop and an omnidirectional vertical sense antenna positioned near the loop. Refer to the table at the end of the article and assume we have the same signal source used to plot the pattern of Figure 1. The column headed "LOOP" shows the readings (the same ones already noted) observed as the loop antenna is rotated to the various angles. The column headed "VERTICAL" shows the reading we might obtain from the omnidirectional antenna.

What is the significance of the negative voltage readings in the "LOOP" column? These show that the phase of the RF voltage reverses as the CCW rotation passes through 90°, then again through 270°. The side of the loop first intercepting the RF field as it propagates across the loop determines the phase (page 877, reference 2, and page 837, reference 3).

The RF voltmeter indicates only upwards, not registering the "negative" voltages. But the addition of the "LOOP" and "VERTICAL" readings, as accomplished in the direction finder circuit of Figure 5, does respond to phase as well as voltage. These readings are shown in the "TOTAL" column.

All results are plotted in Figure 4. The simple loop antenna pickup is shown by the dashed line figure 8 pattern; the pickup of the omnidirectional, vertically polarized "sense antenna" is represented by the dashed line circle; The resultant reading is shown by the solid-line unilateral (cardioid) pattern, the solid line pattern[4].

At VLF and LF the omnidirectional antenna might be as long as 40 feet and supported in a tilted "V". At MF and HF it might simply be a self-supporting loaded vertical whip. Its pickup pattern is a circle (assuming installation away from metallic conductors that may distort its pattern) because it has no directional characteristic.

In this example, we assumed that the vertical sense antenna was picking up a voltage equal to the maximum voltage picked up by the loop. In the real world identical loop and sense antenna pickup is not 100% necessary. However, if the radio directional finder operator adjusts these voltages to make them equal, the resulting radio compass directional characteristic more closely represents the idealized unidirectional cardioid response.

Here are some significant features of the circuit of Figure 5, which is a partial schematic of

a 1920s-era RCA marine direction finder.

(1) The push-pull RF amplifier and center tapped loop help to maintain symmetry. Symmetry as you recall is necessary to achieve the idealized well-defined figure 8-loop response.

(2) The variable coupling balancer provides for adjustment of the coupling between L2 and L1/L3. It allows the operator to adjust the loop antenna and vertical sense antenna for the same relative output in order to more closely obtain a well defined cardioid pattern.

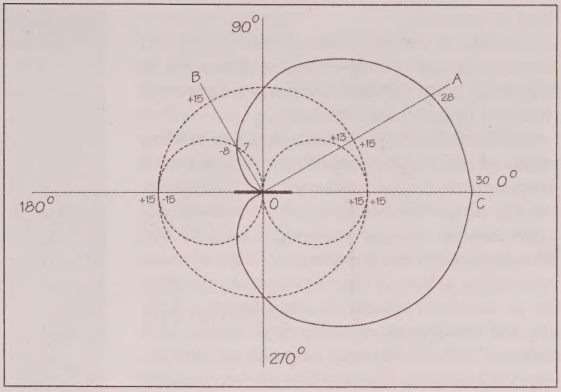

Figure 4. Developing a unilateral (cardioid) pickup pattern.

(3) The variable capacitor connected across the RF amplifier grids allows the loop antenna to be resonated; L4 does the same for the vertical sense antenna[4].

(4) The remaining part of the directional finding system is a heterodyne-type AM radio receiver (if the second detector is simply a peak detector circuit) or a CW type receiver (if the second detector is a beat oscillator) or a regenerative detector circuit.

Engineering level textbooks of the 1920s indicated that, with minimum interference, the angular accuracy of a radio direction finding system was in the order of ½ to 2 degrees. A typical usable range was 50 miles in daylight to 150 miles at night. Users were cautioned significant navigation errors could result if radio direction finder operator:

a. over-extended the range by monitoring very distant stations.

b. took bearings on land based stations located too far inland, especially if the stations were located in mountainous terrain.

c. took bearing on stations no more than a few miles away if those stations are using flattop

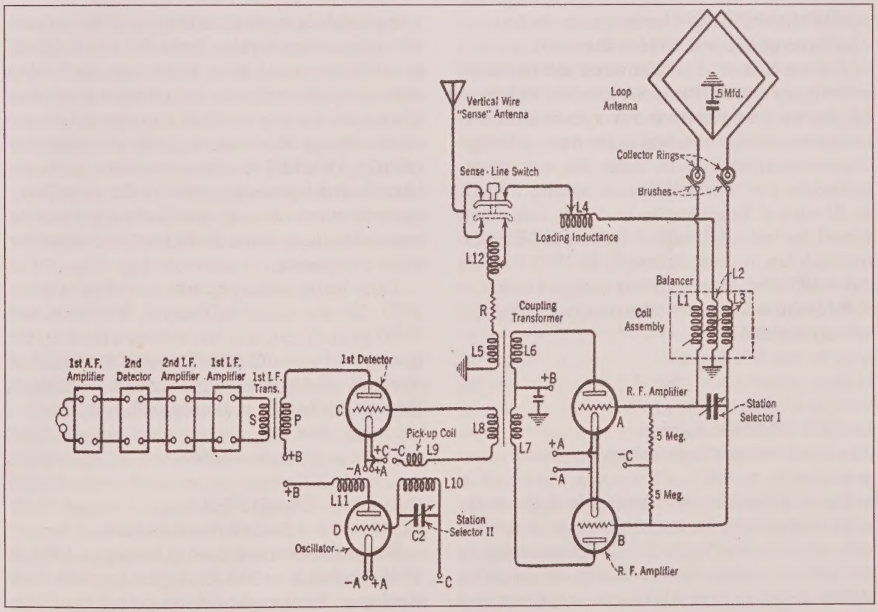

Figure 5. Partial schematic of a 1920s-era RCA marine direction finder.

loaded antennas.

d. did not insist that the ship's rigging and derricks be maintained and stowed exactly as they were when the direction finding equipment was first installed and verified.

As the technology of radio direction finding matured, the large (usually) circular air-core loop antenna designs were replaced with space-saving magnetic core "loopstick" antenna designs similar to those commonly used in AM broadcast receivers. However, in today's world, equipment designers are rediscovering the classic air-core loop antenna. In some direction finding and interference rejecting applications, both air-core loop and magnetic loopstick antenna designs are shielded. The shield is intended to minimize errors that degrade the loop's figure-8 directional pattern. These errors are frequently caused by imbalances that make the loop act as a vertical antenna.

Shielded loop antennas go back as early as 1931, if not before (see reference 3, page 826). You may want to consult more recent textbooks and design handbooks, as well as *The ARRL Handbook*, on modern loop antenna designs.

Sample development of unilateral pickup data using a loop antenna with a sense antenna

ANGLE IN DEGREES	LOOP	VERTICAL	TOTAL
0	+15	+15	30
10	+14.5	+15	29.5
20	+14	+15	29
30	+13	+15	28
40	+11.5	+15	26.5
50	+9.5	+15	24.5
60	+7.5	+15	22.5
70	+5	+15	20
80	+3	+15	18
90	0	+15	15
100	-3	+15	12
110	-5	+15	10
120	-7.5	+15	7.5
130	-9.5	+15	5.5
140	-11.5	+15	3.5
150	-13	+15	2
160	-14	+15	1
170	-14.5	+15	0.5
180	-15	+15	0

About Our Authors

JOHN M. ANDERSON

The General Electric XR-1-A Receiver

Born in Kansas City, Mo, John attended local schools and entered the U.S. Army in 1943. During the war he headed a receiver and transmitter maintenance team attached to the Army Airways Communication System. After the war, he attended the University of Illinois, earning a Ph.D. in Electrical Engineering in 1955. John then joined the technical staff of the General Electric research lab, retiring fron G.E. in 1987. During 1964-1970 he taught plasma measurements at R.P.I. John is a fellow of the American Physical society and the IEEE.

LARRY BABCOCK

The 2003 Annual Conference: One Man's Impressions

Larry Babcock grew up in his dad's radio sales and service business, acting as a service tech while still in high school. After serving in the Infantry during World War II, he earned a BSEE degree at the University of Iowa and began a 37-year career at Bell Aircraft. At Bell, Larry headed programs to develop radar and air-to-air microwave relay links for the RACAL missile system and, later, to evaluate the army's military electromagnetic interference problems. During his last years at Bell, Larry was in charge of the design of electromagnetic compatibility (EMC), TEMPEST, ordnance safety, radiation hazards and lightning immunity for all military equipment produced by the Company. Later he worked in these same fields as a consultant for other companies.

Larry began collecting antique radios in about 1973. He specializes in Federal, Wurlitzer, and WWI aircraft sets, and has written a book on the history of Federal Radio. He is on the board of directors of AWA, Inc. and seves as a guide at the AWA Museum in Bloomfield, NY.

DAVID W. KRAEUTER

From the Junk Box, Or Parts is Parts

David Kraeuter was born in Homestead, PA in 1941. He holds an M.L.S. degree from the University of Pittsburgh. He has edited the *Pittsburgh Oscillator* and the monograph series of the

Note: To save space, the values for the 10° increments from 190° to 360° are not shown. They are identical to the values shown from 0° to 180°, but in reverse order, i.e., 190° is the same as 170°, 200° is the same as 160°, etc.

FOOTNOTES:

[1] For radio direction finding using a simple loop antenna, we rotate the loop for minimum received signal strength. A properly designed and installed loop system has very sharply defined bi-directional nulls. The loop's bi-directional maxima are far too broad to obtain accurate directional characteristics.

[2] There are a number of conventions for using polar plots to show antenna azimuth response. See the more recent ARRL antenna publications for the present standards.

[3] If the loop is a transmitting antenna, Figure 1 represents (1) the signal level received at some distance from the transmitting loop as the transmitting loop is rotated, or (2), the signal picked up by a receiving station as the receiving station rotates around the fixed transmitting loop at a constant distance.

[4] The "pimple shaped" feature at the middle of the broad cardioid lobe is an artifact I caused by not using enough points in my CAD program to draw the cardioid pattern.

[5] A vertical antenna which is too short for the intended operating frequency appears as a capacitor connected in series with a small resistance. The short vertical antenna is tuned to the desired low frequency by resonating out the antenna's capacitance with an appropriate inductance.

REFERENCES

(1) *Everyman's Guide To Radio*, Popular Radio Inc., NY, 1927 edition, page 104 of Section 17, Volume IV.

(2) Duncan, R. L. and Drew, C. E., *Radio Telegraphy and Telephony*, John Wiley & Sons, NYC, 1929, pages 843-880,

(3) *Admiralty Handbook Of Wireless Telegraphy 1931*, His Majesty's Stationary Office, London, England, December 1931. page 826, section 791 and page 835, section 798 through page 863, section 814.

Pittsburgh Antique Radio Society. Currently, David writes the book review column for *The OTB*. Since the 1980s he has been interested in making the vast wealth of information buried in national patent publications more accessible to the public. He thinks he has made a beginning in this work with his latest book, *Radio Patent Lists and Index, 1830-1980*, published by the Edwin Mellen Press. In 620 pages, the book tabulates and indexes 6,200 U.S. and British patents issued to 100 radio and television inventors.

JAMES P. RYBAK, W0KSD
John Logie Baird's 1928 Stereoscopic Televisor

James Rybak was born in Cleveland, Ohio in 1941. He has been interested in both radio and electronics, first as a hobby and then as a profession, for over 40 years. Jim holds B.S., M.S., and Ph.D. degrees in electrical engineering as well as Extra-Class amateur radio license W0KSD. He teaches engineering and mathematics at Mesa State College in Grand Junction, Colorado. In recent years, he has published numerous articles in the U.S. and abroad on the history of both wireless and electrical technology. When not writing articles, he spends his free time trying to achieve "Worked All States" through the low-earth-orbit amateur radio satellites as well as trying to become knowledgeable about digital photography and slow-scan television.

MIKE TUGGLE, WY3B
Designing a DX Crystal Set

Mike Tuggle was introduced to the world of crystal radios by a Cub Scout slider-tuned set—the one you built on its box top. Some time later he "re-discovered" the DX possibilities of crystal sets made from quality components such as air-variable capacitors and carefully wound coils. He has been a member of AWA, radio collector and restorer, and frequent Conference attendee since about 1975. After an education in chemistry and a career in industrial safety and health—having nothing at all to do with radio or electronics—Mike has retired to the DX-paradise of Hawaii to devote more time to understanding and researching how these fascinating crystal radios work.

Classified Ads

Old-time ads are free to members collecting and restoring equipment for personal use. Please observe the following: (1) one ad per issue per member; (2) include as SASE if acknowledgement is desired; (3) material must be more than 25 years old and related to electronic communications; (4) give your full name, address and zip code; (5) repeats require another notice (we are not organized to repeat automatically); (6) the AWA is not responsible for any transaction; (7) we retain the right to reduce an ad's size if over seven lines; (8) AWA does not accept commercial advertising in this column; and (9) closing date is six weeks prior to first day of month of issue. Ads received after that time will be held for the following issue. Mail all ads to: **RICHARD RANSLEY, P.O. BOX 41, SODUS, NY 14551**.

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1950s portables, battery/mains: Cossor metal/plastic, v.g., works, $90.; Grundig Drucktasten boy 55, cream/black plastic, works, $100.; table top Grundig 75WEM, plastic, works, $50.; Murphy 152, bakelite, works, $60.; Tesla 402U, baakelite, v.g., works, $60.; Tesla 402U, Bakelite, v.g., works, $90.;Telefunken 6151W Atlanta, plastic cream/red, v.g., works, $100.; Aargyrios Adamidis, Panoramatos 38, Panorama, Thessaloniki, Greece 55236 E-mail: aadamAacc.teithe.gr

1942 Capehart Radio-Phono console, Model 111M 2FM. In family since new, $250. Len Aquilino, 7187 Lakeshore Rd., Cicero, NY or call brother Armand at (315) 436-4199

Consoles for sale include Grunow Model 1191, 1938, clock dial; Grunow Model 1291, 1937; Zenith Model 10S, 1940 High Boy w/ record player; E.H. Scott Model 800B, 1946 Chippendale cabinet w/walnut finish/record player/twenty-three tubes. All radios play well, with good to excellent cabinets. Richard La Flamme, 310 N.W. Tuscany Lane, Port Saint Lucie, FL 34986 (772) 343-9586

SELL/TRADE—GENERAL

Have too much stuff. Send two stamp SASE or E-mail for my list of tubes and parts, etc. Lots of old tubes and books. Wayne Letourneau, P.O. Box 62, Wannaska, MN 56761 E-mail: letourneau@wiktel.com

AK radio collection: Model 10C breadboard, 20 big box, 20C, 21, 30, 32, 33, 35, 36, 42, 44, 53, 60, 70, 80, 145, 185; Hallicrafters SX-24, with speaker; Scott All World Hi-Fi console all chrome chassis and amp; AK Service Manuals; Gernsback Radio Encyclopedia. Ronald Graves, 3120 N. 72 Way, Hollywood, FL 33024 (954) 964-2063

Collection, extra large, 66 ft. by 44 ft. room, floor and loaded wall shelves. Radios, parts, photographic, electrical, ham radio and parts, Radio-TV service shop instruments, public address mics, amps, horns, broadcast mics, amps, speakers, military electronics, manuals, 1800 technical engineering books, catalogs, WWII flyers, brochures, circuits, (12 file drawers full). Racks, cabinets, panels, chassis, meters, aluminum boxes, 85 transformers, fans, blowers, rectifiers, capacitors, 50 ohm carbon loads, coils and turns counters. Francis Yonker, 1229 Inverary Place., State College, PA 16801, (814) 867-1400 E-mail: yonker1229@adelphia.net

Type 3 Central Scientific Spark Transmitter, Spark Gap Transmitter with Type 44 Marconi Condenser, J.H. Bunnell Sounder with long arm & wooden mount, Type BC115 Signal Corps Receiving Tuner, Ruhmkorff Spark Induction Coil, Type 358 General Radio Wavemeter, Type 558-P Amateur Band Frequency Meter. Larry Chambers, 5026 Suter Drive, Nashville, TN 37211 (615) 833-2448

Sony stereo Reel to Reel tape recorder with speakers, needs minor work, $25 plus postage; working

4 speed Newcomb/Audiotronics school record players, works well, $35. plus postage for each. Don Maurer, 29 S. 4th St., Lebanon, PA 17042 (717) 272-2481 E-mail: dmradios@aol.com

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Mallory VP555 Vibropack 6 volt input, 300 volts output at 200 ma. New, never used, $30. Also 1935 Ford-Philco auto radio, $60. William Beckett, 6 Wax Myrtle Lane, Hilton Head, SC 29926 (843) 837-2435 NE-mail: wbeccath@hargray.com

SELL/TRADE—LITERATURE

Ten (6"×9" ranging from 12 pages and cover to 32 pages and cover) publications by Bell Telephone Systems on Western Electric microphones and related subjects. Les Rayner, 5512 N. 71st Place, Scottsdale, AZ 85253

1926 Grebe Syncrophase instruction manual. This 74 page excellent copy manual features the Grebe MU-1 and includes a brief history of the A.H. Grebe & Co., photos of the manufacturing process, early Grebe receivers, specifications and component elements, schematics and more, $20. Also available are plans for building crystal sets; one and two tube radios from junk-box parts. Write or E-mail for list. Ernie Nagy, P.O. Box 822, Elk Rapids, MI 49629-0822 (231) 264-9412 E-mail: elnagy1599@webtv.net

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*QST*s for sale starting with late 1920s. Send for list or ask for specific issues. Most are clean except for some of the earlier issues. $1. per issue or 3 for $2., 6 for $5. plus postage. Charles Graham, K2GVE, 4 Fieldwood Drive, Bedford Hills, NY 10507 (914) 666-4523

SELL/TRADE—TRANSISTOR/CRYSTAL SETS

Old portable transistor radios: French germanium Telemonde Partner 8, not working, $40.; Telefunken Manta, multiband, v.g./excellent, but mains switch has bad contact, works, $50.; Belgian germanium Novac 112W, v.g., $110.; Soviet germanium Spidola, plastic red/cream, v.g., works, $250.; Soviet Vef 209, multiband, v.g., works, $100.; Soviet Vef 206, $80. Argyrios Adamidis, Panoramatos 38, Panorama, Thessaloniki, Greece 55236 E-mail: aadam@acc.teithe.gr

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Galena crystal radios and parts. Pictures available. Homemade, improved sensitivity and selectivity. Radio tubes, most used, test OK, free list. Len Gardner, 458 Two Mile Creek Road, Tonawanda, NY 14150 E-mail: radiolen@att.net

WANTED—COMMUNICATIONS GEAR

Hallicrafters speaker R-48 or R-48A. Allen Brokaw, 4262 Co. Rd. 23, Cardington, OH 43315

Speaker for Hallicrafters SX-28. Marc Ellis, 1914 Colfax St., Evanston, IL 60201; 847-869-5016; mfellis@rcn.com.

WANTED—DONATIONS

The non-profit historic house Stan Hywet Hall and Gardens in Akron, OH (www.stanhywet.org) is currently recreating the Radio Room used by Franklin Seiberling, during 1916-1930. Some original equipment remains, but are seeking the following items: collapsible antenna, headsets, tubes, wiring used from battery to radio, battery charger, battery, light bulb sockets for a homemade electric switchboard tower, horn, and a speaker for a Radiola 17. Any books and manuals or radio paraphernalia would also be appreciated. To donate radio items or volunteer, please contact Mark Heppner at Mheppner@stanhywet.org or Barbara Havrenek at Bhavranek@VirginiaMartiCollege.org

WANTED—GENERAL

Nine or ten tube receiver using Rusco Band-Pass and Camfield parts. Restorable. Also, any literature on 1920s Superhets. Thank you! Richard Ammon, 316 West Fourth Ave., Cheyenne, WY 82001 Toll-free (888) 473-2387 E-mail: wireless@ superhets.info

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Electro-Voice Model 3303 or 3304 tuner. Early audio amplifier using 2A3 tubes. Jerry Talbott, 1440 SW 239th Ave., Hillsboro, OR 97123 (503) 649-6717 E-mail: vinradio@easystreet.com

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Anything by David Grimes: radios, advertising, ephemera, stories, literature, references. Please contact: Mike Grimes, K5MLG, 3805 Appomattox Cir., Plano, TX 75023 (972) 867-6373 E-mail: grimesm@flash.net

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Scarcer items prior to 1925. Receivers, transmitters, speakers, tubes, etc. Will consider quality collection. Can travel. Ed Bell, 5311 Woodsdale Rd., Raleigh, NC 27606 (919) 851-1517 E-mail: ebell@nc.rr.com

(continued on page 67)

On the Internet

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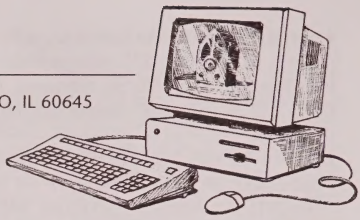
PLEASE INCLUDE SASE FOR REPLY. E-MAIL: caschwark@aol.com



Restoration Resources on the Web

Many antique radio websites have links to sources for parts, services and repairs these days. Some sites have what could be called generic resource links, but many are specific to one manufacturer, like Zenith, Philco or RCA-Victor, or even one model. Everyone has their favorite vendors of course, so I recommend these sites and sources on their own merits. The few I've singled out below represent just the tip of the iceberg. You could spend days just looking at all the on-line resources available.

If you are new to the hobby or have not ventured into repairs, don't be shy. Many radio clubs have members who do repairs and your local radio club is a good place to start with questions about a radio that might be beyond your expertise. Joining a club is the quickest way to get yourself "up to speed" in this hobby. *Antique Radio Classified*'s website (www.antiqueradio.com) has a listing of radio clubs. Also browse the Recurring Meetings & Events section in this issue of *The OTB* for club schedules and events near you.

Antique Radio Grille Cloth Headquarters
http://www.grillecloth.com

Since 1991, John Okolowicz has been providing high quality reproduction grille cloth in many patterns and designs for antique radios from 1920 thru 1940. On-line sample pictures and installation guidelines and more.

ChildhoodRadios.com
http://www.childhoodradios.com

A site for electronics collectors, particularly those interested in transistor pocket radios from the 50s and 60s. Resource for parts, schematics, battery adapters and transistors.

Garage 'A Records
http://www.garage-a-records.com/

Replacement Phonograph Needles / Turntable Needles(Styli), Including 78rpm. Crystal, Ceramic and Magnetic Cartridges. Replacement Phonograph Parts.

Just Radios
http://www.geocities.com/justradios/

Specializing in Canadian Antique Radio Schematics. USA and European tube radios as well. Large selection of capacitors for repair work.

McMaster-Carr Supply Co.
http://www.mcmaster.com/

Looking for that braided phosphor bronze dial cord for your Radiola dial re-stringing project? They have it as wire rope under catalogue number 3462T12. ¾₄" diameter, 6x7 construction. Sold by the foot. Over 400,000 items in their catalogue. The on-line catalogue is massive — any doo-dad you can think of. A tinkerer's dream.

PhilcoRadio.Com
http://www.philcoradio.com

Ron Ramirez' website dedicated to Philco radios. Ron Ramirez Enterprises is his repair and restoration service. Site also offers technical info, schematics and a Philco photo gallery.

The Philco Repair Bench
http://www.philcorepairbench.com/

My own site. Has many resources for the Philco radio collector and restorer: Schematics, service tips, tube manual, Philco radio parts values, links to other helpful sites, and much more.

RADIO DAZE
YOUR SOURCE FOR VINTAGE RADIO & ELECTRONICS

PlayThings of Past
http://www.oldradioparts.com

An extensive collection of new, used and new-old-stock parts. Just about one-stop shopping.

Radio Daze
www.radiodaze.com

Working to become the premier source of components, products, services, supplies and information for the vintage electronics marketplace. Tubes, components, books, dials, tools, refinishing supplies

The Radiola Guy
http://www.radiolaguy.com/

Reproduction Radiola manuals and parts. This site offers items for sale, information and virtual museum, all related to early radio and TV.

Dick Oliver's Reproduction Philco Cabinet Parts
No web site as yet

Dick Oliver, 1725 Juniper Place, Apt. 310, Goshen, IN 46526, (574) 537-3747, Email: dolivears@ aol.com

For Philco cathedral models: Front Panels – Base Moulding – Rear Arch Supports; For the Philco Grandfather or Colonial clock: Finials – Trim pieces.

Rock-Sea Enterprises
http://members.aol.com/RockSeaEnt/

Reproduction radio dials, dial scales and decals for a wide array of models and manufacturers. Their website also has lists of other restoration services.

Syl's Old Radios
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CLASSIFIEDS, *continued from page 65*

Looking for the headset model I had as a kid. It is a Murdock with all-bakelite receivers similar to the green-cord Murdocks commonly seen at radio meets. However, cord connections to the receivers are internal rather than via external pin jacks; headset band covering is brown leather rather than fabric. Marc Ellis, 1914 Colfax St., Evanston, IL 60201; 847-869-5016; mfellis@rcn.com.

WANTED—LITERATURE

Schematic and information for a military frequency standard Model AN/URQ-10. Roger Asman, 15383 Blue Skies Ct. W., Livonia, MI 48154-1515 (734) 464-0426 E-mail: Rogerasman2@aol.com

Owners and service manuals for Hallicrafters SX-28. Marc Ellis, 1914 Colfax St., Evanston, IL 60201; 847-869-5016; mfellis@rcn.com.

WANTED—PARTS

Chassis for Lyric/Mohawk S-6 radio, non-working OK. Metal band surrounding the horn and neck of a Music Master horn speaker. James S. Fisher, RR1, Box 861, Port Royal, PA 17082 (717) 527-2224 E-mail: yrless@tricountyi.net

Have the complete chassis with tubes and tuner for a 1936 Patterson All-Wave Radio Model 106 AW. Looking to buy a cabinet with speaker for this model. Also would like to have photos or other print information if available. Steve Hormann, P.O. Box 73652, Fairbanks, Alaska 99707

Need HRO-W coil set. Coils of this version have a single engraved metal plate coil chart, without bandspread ranges, as this set was made for military use only. Joe Devonchik, WB4LUT, P.O. Box 150, Sealevel, NC 28577 (252) 225-9964

Atwater-Kent Model 44 small tuning knob, with screw and spring. This knob pushes against large tuning knob. Ron Zammit, 3841 Santa Domingo, Arroyo Grande, CA 93420 E-mail: rzammit@monet.calpoly.edu

For first "Walkie-Talkie", the BC-222 (and BC-322): Antenna AN-29 or AN-29B, or AN-30 or AN-30-B. Also seeking handset TS-11 microphone T-24, headset HS-22 and manual, TM-11-228 for same. John Field, 117 Arroyo Place, Santa Cruz, CA 95060-3139

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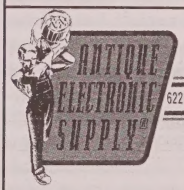

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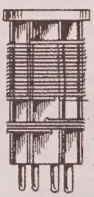
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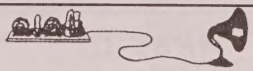
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ANNOUNCING *AWA REVIEW* VOLUME 16

The 2003 *AWA Review* is now available for shipment. It includes five subjects that constitute a valuable information resource for collectors, historians, and anyone who enjoys reading about radio history.

The lead article on Powel Crosley, Jr. and the Crosley Radio Company is by Charles J. Singer, a long-time Crosley employee. Crosley's many business endeavors are described, with particular emphasis on radio manufacturing and broadcasting. This is a particularly detailed and complete paper and includes many never-before-seen photographs.

The development of the portable spark transmitter-receiver "pack sets" made for the U.S. Navy and the Army Signal Corps, is traced by the team of Russ Kleinman, Karen Blisard, Jim and Felicia Kreuzer and August Link. The authors have used the archives of the National Museum of American History and other sources, and included many early photographs that have never been presented in print.

Charles Kirsten traces the development of the well-known and widely-used Rider's Manuals for radio repair. Certainly anyone who has been involved in radio restoration is familiar with Rider's, but few realize the complex stages of development that went into the creation of these books and the influence on them of major characters and personalities in the radio service field.

An unusual article by Barbara Havranek addresses an often-overlooked aspect of the development and manufacture of early radios, the grill cloth that decorated and protected the speakers openings. The author, an expert in the field of industrial design, writes about the aesthetic characteristics of different cloths as well as the technical details of how well they performed their job of protecting the speaker while allowing unimpeded transmission of sound. A full-page color plate shows thirty-four grill-cloth designs, which the text correlates with specific manufacturers and radios.

Finally, our editor, Tom Perera, has put together and included a cumulative table of contents of all the *AWA Reviews* since publication began in 1986. This will be of considerable assistance to in locating back issues of interest. *Price, $19.95 postpaid in U.S. and Canada; elsewhere,add $5.00.*

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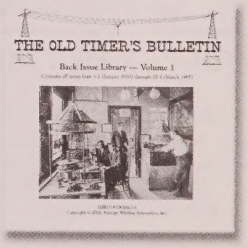

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Another out-of-print classic, *The Hallicrafters Story* by Max Dehenseler, HB9RS, is also back as a CD. Max De Henseler was a personal friend of Hallicrafters founder Bill Halligan, and his book provides unusual insights into Halligan's life and early struggles. This well-illustrated book has 245 pages, a nice Index and several handy lists of models and features. The CD can be displayed on any PC with Acrobat reader version 6.0 or higher.* Order now for Christmas delivery or sooner. Thanks so much to Max De Henseler for his thoughtful gift of publishing rights to the AWA Museum. Price is $14.95, postage paid in U.S. and Canada; elsewhere, add $5.00.

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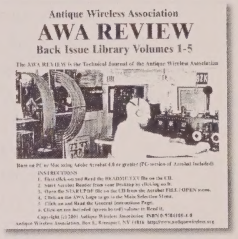

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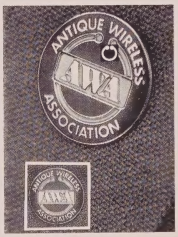

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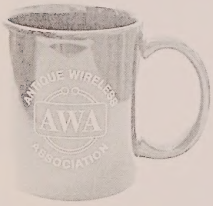

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